Level II
Hazardous Materials Investigation Report
Lower Guadalupe River
Flood Control Project

Volume I
Text and Plates

Submitted to:

Santa Clara Valley Water District

May 11, 2001

KLEINFELDER

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An employee owned company

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Ms. Shola Idowu
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SUBJECT: Transmittal of Final Report, Level II Hazardous Materials Investigation, Lower Guadalupe River Flood Protection Project.

Dear Ms. Idowu:

Kleinfelder Inc., (Kleinfelder), is pleased to submit eight copies and one unbound copy of the Final Level II Hazardous Materials Investigation Report for the Lower Guadalupe River Flood Protection Project.

The report is submitted in two volumes. Volume I contains the report text and plates. Volume II contains tables, boring logs and field reconnaissance sheets. A hard copy of the analytical laboratory reports was submitted to you along with the revised draft report.

We appreciate the opportunity to provide environmental services to the Santa Clara Valley Water District. Should you have any questions, please do not hesitate to call.

Sincerely,

KLEINFELDER, INC.

Charles Almestad, R.G., C.HG.
Senior Client Manger

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FINAL REPORT
LEVEL II HAZARDOUS MATERIALS INVESTIGATION
LOWER GUADALUPE RIVER FLOOD CONTROL PROJECT
SAN JOSE, SANTA CLARA COUNTY
CALIFORNIA

PREPARED FOR:	Santa Clara Valley Water District 5750 Almaden Expressway San Jose, California 95118
ATTENTION:	Ms. Shola Idowu

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A Report Prepared for:

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FINAL REPORT
LEVEL II HAZARDOUS MATERIALS INVESTIGATION
LOWER GUADALUPE RIVER FLOOD PROTECTION PROJECT
SAN JOSE, SANTA CLARA COUNTY, CALIFORNIA

Job No, 12-3058-01/900

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FINAL REPORT

LEVEL II HAZARDOUS MATERIALS INVESTIGATION

LOWER GUADALUPE RIVER FLOOD PROTECTION PROJECT

SAN JOSE, SANTA CLARA COUNTY, CALIFORNIA

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BORING LOGS

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FIELD OBESERVATION WORKSHEETS

LIST OF ABBREVIATIONS AND ACRONYMS

APN	Assessor's Parcel Number
AST	Above Ground Storage Tank
bgs	Below Ground Surface
CAL/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CERCLIS	Comprehensive Environmental Response, Compensation & Liability Information System
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CGM	Combustible Gas Meter
CH_4	Methane
COC	Chain-of-Custody
Corps	U.S. Army Corps of Engineers
District	Santa Clara Valley Water District
DOT	United States Department of Transportation
FEMA	Federal Emergency Management Agency
FID	Flame Ionization Detector
IDW	Investigation-Derived Waste
HASP	Health and Safety Plan
HML	Hazardous Material Laboratory
km	Kilometer
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LDR	Land Disposal Restriction
LEL	Lower Explosive Limit
Level I Investigation	Level I Hazardous Materials Investigation
Level II Investigation	Level II Hazardous Materials Investigation
LUST	Leaking Underground Storage Tank

m	Meters
MCL	Maximum Contaminant Level
mg/kg	Milligrams per Kilogram
ml	Milliliters
MS/MSD	Matrix Spike/Matrix Spike Duplicate
OVM	Organic Vapor Meter
PAH	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
Pesticides	Organochlorine Pesticides
PID	Photoionization Detector
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
ppmv	Parts per million by volume
PRG	Preliminary Remediation Goal
Project	Lower Guadalupe River Flood Control Project
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

RDL	Reporting Detection Limit
RPD	Relative Percent Difference
STLC	Soluble Threshold Limit Concentration
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TOL	Top of the Levee
TPH	Total Petroleum Hydrocarbons
TPHd	Total Petroleum Hydrocarbons as diesel
TPHg	Total Petroleum Hydrocarbons as gasoline
TRPH	Total Recoverable Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentration

UPRR	Union Pacific Railroad
USA	Underground Service Alert
EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UTS	Universal Treatment Standard
Vista	Vista Information Solutions, Inc.
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
WET	California Waste Extraction Test

FINAL REPORT

LEVEL II HAZARDOUS MATERIALS INVESTIGATION

LOWER GUADALUPE RIVER FLOOD PROTECTION PROJECT

SAN JOSE, SANTA CLARA COUNTY, CALIFORNIA

1.0 EXECUTIVE SUMMARY

The Santa Clara Valley Water District (District) is planning flood control construction along the Lower Guadalupe River in Santa Clara County, California. The Lower Guadalupe River extends between the Highway 880 bridge in the south to the Union Pacific Railroad (UPRR) bridge in Alviso, in the north. One of the objectives of the flood control project is to restore the 100-year flood capacity of the river and to provide the necessary freeboard to meet the U.S. Army Corp of Engineers certification requirements for levee systems. The Flood Control Project may involve modifying the existing levees on the inboard side (referred to as channel modification), raising the height of levees, construction of retaining walls, flood walls, and access ramps, and sediment removal. Also, mitigation ponds and wetlands may be constructed.

The Level I Investigation for the Lower Guadalupe River identified 20 areas of concern within the river alignment which have the potential to chemically impact soils and groundwater in areas where property acquisition and project construction may occur (Additional parcels were identified during the course of the Level II hazardous material investigation.). Due to environmental impacts which may adversely affect construction activities or may expose the District to financial liability associated with clean up of contaminated material, the District contracted Kleinfelder, Inc. (Kleinfelder) to perform a Level II Hazardous Material Investigation.

1.1 Soil and Groundwater Investigation Summary

The Level II Investigation included the updating of information provided in the Level I investigation, a reconnaissance visit along the river alignment and the collection of soil and groundwater samples from river sediment, levee embankments and individual properties for chemical analyses. The sampling work was carried out in two phases. The Phase I sampling was performed between August and October of 1999. The Phase II sampling work was performed between September and October of 2000. The Phase II sampling work was carried out to confirm and/or better delineate certain areas of concern that may impact project construction and property acquisition and to fill data gaps identified after the District's refinement of design alternatives (which occurred after Phase I Sampling was completed). Also, Phase II sampling included sampling of soils on Reach A levee embankments (Guadalupe River levee embankment between Highway 880 and Highway 101). Plate 1 shows the project alignment and all borings drilled in the Level II investigation.

Over the course of the Level II Hazardous Material Investigation, soil and ground water samples were collected for chemical analyses on or adjacent to 29 individual properties. River sediment samples were collected in 48 locations. Embankment samples were collected in 85 locations (including Reach A). Additional soil and groundwater samples were collected near two storm drains and specific geotechnical borings drilled along the Guadalupe River alignment by others. All together, 200 borings were drilled and 475 soil and 42 ground water samples were collected for chemical analyses. Chemical analyses varied depending on the purpose of each borehole; however, the overall suite of analyses performed during the investigation generally included Title 22 metals, pesticides and PCBs, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbon as gasoline (TPHg),and diesel (TPHd), and asbestos.

The Level II Investigation was performed according to the "Final Workplan, Level II Hazardous Materials Investigation, Lower Guadalupe River Flood Central Project, San Jose, Santa Clara County, California" prepared by Kleinfelder and dated August 20, 1999. Chemical analyses were performed during Phase I sampling by the District's contract laboratories (Sequoia Analytical and Clayton Environmental Laboratories). Phase II sampling chemical analyses were performed by Chromalab under subcontract to Kleinfelder.

1.2 Investigation Summary Results and Recommendations

Sediments Samples

The primary objective of the river sediment investigation was to identify, confirm and evaluate the impacts of hazardous material contamination in river bed sediments on project construction. In general, metals and pesticides were found below Total Threshold Limit Concentration (TTLCs) regulatory limits; that is, samples containing these chemicals were not found to be hazardous for excavation and disposal purposes. In the few cases where metals (i.e. mercury in 2 out of 172 samples) and pesticides (i.e. 4,4, DDT and derivatives in 1 out of 132 samples) were found to exceed their respective TTLCs. The high concentrations were not confirmed in follow-up sampling efforts. Given the results of this study, we recommend no further investigation of the sediment quality. Sampling and analyses may, however be required in the future for disposal of removed river sediments in order to meet disposal criteria.

Embankment Samples

The primary objective of the embankment assessment was to identify, confirm and evaluate the impacts at hazardous material contamination in embankment areas or underlying soils on project construction.

Soils

Lead was detected at concentrations exceeding the current regulatory disposal limit of 350 mg/kg (as required under Assembly Bill AB2784) and the TTLC regulatory limits of 1,000 mg/kg in soils in seven borings located in four embankment areas. Five of these borings were drilled in two areas within an approximate 1,100-foot (350 m) reach of the river alignment near the Gold Street Bridge (Alviso area). Lead above the disposal limits was also found in boring EB8+145W located south of the Highway 237 bridge and at boring EB7+550E located approximately halfway between Highway 237 and the Gold Street Bridge on the east bank. Pesticides 4,4 DDT and its derivatives were found in concentrations exceeding its TTLC in eight of the 203 samples analyzed (or in eight borings out of 85 boring locations). Additional samples collected in the same borings at depths either above or below the high 4,4 DDT and derivatives samples were found to be below TTLCs. The high DDT samples were found sporadically and follow-up samples did not verify the presence of high concentrations of DDT and its derivatives.

The eleven areas of concern where inboard embankment soils were found with pesticide or metals concentrations greater than TTLC regulatory limits or other disposal limits are illustrated on Plates 4.1a through 4.1i. These areas are listed below:

- Station 7+250W to 7+360W (lead – EB7+300W at 2.5 feet and EEB7+301W at 4.5 feet)
- Station 7+440W to 7+630W (lead – EB7+470W at 19 feet, EB7+471W at 9.5 feet and EB7+600W at 10 and 14.5 feet; zinc – Eb7+600W at 19 feet)
- Station 7+500E to 7+600E (lead – EB7+550E at 25 feet)
- Station 8+090W to 8+150W (lead and arsenic – EB8+145W at 20 feet)
- Station 8+595E to 8+800E (pesticides – SEB8+700E at 20 feet)
- Station 8+950E to 9+050E (pesticides – SEB9+000E at 20 feet)
- Station 9+050W to 9+535W (pesticides – SEB9+318W at 2.5 feet)
- Station 9+630E to 10+110E (pesticides SEB9+812E at 1 foot)
- Station 11+080 to 11+230E (pesticides – SB11+153E at 10.5 feet)
- Station 11+495E to 11+505E (pesticides – EB11+501E at 10.5 feet)
- Station 14+005W to 14+400W (pesticides – SEB14+115W at 2.5 feet and SEB14+228 at 4.5 feet) (also reported in individual property 4.3.13)

Certain areas near the toe of the outboard embankment toe were also found to have chemically impacted soil. These areas are discussed in the report along with the individual properties.

If the District plans excavations for the Project along the inboard embankment areas, listed above Kleinfelder recommends that embankment soils at these eleven locations be segregated during construction. The stockpiles should be sampled and chemically analyzed for contaminants of concern prior to disposal at an appropriate landfill. The District should consider performing additional investigation to define the extent of contamination in the vicinity of boring EB7+550E and EB8+145W and in other areas where data are limited to potentially reduce the volume of impacted soil needing special handling and disposal. Reuse or disposal of soils should be performed following guidance in a Soil and Groundwater Management Plan.

Groundwater

VOCs and metals, in excess of National Pollution Discharge Elimination System (NPDES) General Permit discharge limits were detected in groundwater in embankment borings associated with the:

- SCVWD property (VOCs, SVOCs – borings SEB7+010E)
- Levee area adjacent to Felton Norborn property (VOCs, SVOCs - borings SEB7+098W)
- State of California property (VOCs – boring SEB7+155W)
- Levee area adjacent to State of California and Lick Mill properties (VOCs and/or metals - borings SEB10+864W, SEB10+980W and SEB11+005W)
- Levee area adjacent to MacPhee-Barbieri property (VOCs and lead-borings SEB12+715W and SEB12+900W)

TPH in excess of the General NPDES Permit discharge limitations was reported in groundwater in groundwater in embankment borings:

- Levee area adjacent to Felton Norborn property (TPHg, TPHd - SB7+098W and SEB7+047W)
- Levee area adjacent to Gibson and Key Metals property (TPHd - boring SEB12+140E)
- Levee area adjacent to Altos Computer Systems property (TPHd - borings SEB13+303E and SB13+150E)

In many samples collected along the Guadalupe River alignment the laboratory reported that the TPHd chromatograms did not match the diesel standard. It is possible that other naturally occurring organic compounds may be reported as TPHd. Therefore, the General NPDES Permit discharge limits may not be applicable in those locations.

If the District plans to excavate any of these areas with affected-groundwater listed above, Kleinfelder recommends that the District should plan to treat any groundwater encountered to meet NPDES permit discharge limits prior to discharge. Since the depths to groundwater ranged from about 5 feet to 19 feet in borings and groundwater surface elevations are expected to vary with time and season, the District should consider performing construction of these areas during summer or fall months in order to avoid treating large volumes of groundwater prior to discharge. Finally, dewatering, testing, groundwater treatment and disposal should be carried out following guidance provided in the Soil and Management Plan.

Individual Properties

The District initially planned acquisition of 53 individual properties in portion or whole at the beginning of the investigation. Out of the 39 properties investigated only nine would require additional investigation if the District plans to acquire the properties. Fourteen properties could not be investigated due to the denial of Right of Entry by property owners. The purpose of the individual property investigation was to evaluate the impacts of hazardous material contamination on property acquisition, design and construction of the project.

Soil

Pesticides and metals affected soil was found sporadically in individual properties borings. On nine individual properties, pesticides or metals were detected in soil at concentrations that would be considered hazardous for excavation and disposal purposes. For each of the nine properties the affected samples were found in borings at or near the outboard levee toes. The chemical affected soil detected in this investigation may impact the project if the sites are acquired and excavated or if excavation into native soil is performed near the outboard toe. Soil borings associated with the following individual properties (and their individual report section numbers) were found to contain hazardous concentrations of chemicals in soil:

- Section 4.3.6 - Sports and Open Space Authority (pesticides at 1.5 to 2.5 feet);
- Section 4.3.10 - Wyse (pesticides at 1.0 feet);
- Section 4.3.13 - City of San Jose (pesticides at 2.5 to 3.0 feet);
- Section 4.3.14 – Atmel (pesticides at 1.0 to 1.5 feet);
- Section 4.4.1 - Sylvia (mercury at 14.5 and 19.5 feet below top of levee (TOL));
- Section 4.4.2 - SGA Development Partnership (pesticides at 1.0 to 2.5 feet)
- Section 4.4.6 - Gibson and Kay Metals (pesticides at 1.0 feet)
- Section 4.4.9 - Hurlbut Family Trust (pesticides 1.0 feet); and
- Section 4.5.2 - Renaissance Assoc./Gibson-Spino /A-M & Nel Associates (pesticides at 20 feet below TOL).

Kleinfelder recommends that procedures outlined in the Soil and Ground Water Management Plan be implemented should the District acquire any of the above listed properties or if the District excavates at the outboard toe of the levee on District property in the known impacted areas associated with these properties.

Groundwater

Groundwater was sampled within individual properties borings. Six individual properties where chemical concentrations in groundwater exceed General NPDES Permit discharge limits are listed below.

- SCVWD (4.3.1) (VOCs, SVOCs)
- State of California (4.3.3) (VOCs)
- City of Santa Clara (4.3.4) (VOCs)
- City of San Jose (4.3.7) (pesticides)

- State of California (4.3.110 (metals)
- State of California (4.5.1) (metals)
- State of California (4.7.3) (VOCs)

Contaminated groundwater at these sites may impact the project construction and property acquisition if it migrates under the levees to where excavations may be planned. If groundwater is encountered during construction in the adjacent levee areas where chemicals were detected, Kleinfelder recommends that the District test the groundwater prior to discharge to ensure that it meets the NPDES discharge requirements. Testing, treatment and discharge should follow guidelines in the Soil and Groundwater Management Plan.

At the following two individual properties TPHd was reported in groundwater above the General NPDES Permit limits. As noted above there is uncertainty whether the TPHd reported is from diesel or other naturally occurring organic compounds.

- Sainte Claire (4.3.1)
- KLA-Tencor Corporation (4.4.3)

If the District plans excavation in the vicinity of these sites the question as to whether the TPHd is naturally occurring or from diesel product should be answered by further sampling and chromatographic evaluation. This work may eliminate the need for treatment prior to discharge.

Optional Work Sites

Optional work performed includes the investigation of soil and groundwater quality associated with two storm drains and three previous geotechnical borings installed by Woodward Clyde Consultants and investigated by the District. Kleinfelder does not recommend further investigation related to the storm drains and geotechnical borings.

1.3 General Recommendations and Health and Safety Considerations

As hazardous concentrations of chemicals were identified in certain areas during the Level II investigation Kleinfelder believes that Title 8 California Code of Regulations (CCR) Section 5192 would apply to this work (Hazard Communication Standard). According to this regulation the District must provide information to the contractor regarding the types and concentrations of hazardous chemicals that may be encountered during construction.

The District also should be aware that the construction contractors to whom bid documents will be sent should have implemented an Injury and Illness Prevention Program (IIPP)in accordance with Title 8 CCR Section 1529. This IIPP should provide for workers who will be in contact with hazardous substances to be 40 hour trained in accordance with the hazardous waste operator emergency response regulation (Title 8 CCR Section 5194). The IIPP also should call for compliance with other applicable Federal, State and local regulations as appropriate.

1.4 Summary of Estimated Costs

Estimated costs were developed for the excavation and disposal of soils and treatment of removed groundwater water in embankment areas with known and confirmed impacts. Where impacts are uncertain we have prepared unit cost information. Also, a range of estimated costs were developed for the treatment of groundwater to aid in addressing the uncertainty in the estimated costs as the volume and duration volume of water requiring treatment are uncertain. These cost estimates were prepared for planning purposes only, and are approximate and do not constitute a bid for the work. Also, sampling and testing of actual excavated soils for waste characterization will need to be carried out for disposal acceptance at a licensed facility.

Cost estimates were developed for the excavation and disposal of soils on the embankments that were identified as impacted and would require disposal as a hazardous waste (Section 4.2.4). If the project alternatives under consideration include channel modification downstream of Montague Expressway and levee raising upstream of Montague Expressway. Ten impacted areas were identified where channel modifications are anticipated and two areas were identified where the levee may be heightened. An estimated 49,160 cubic meters of soil would need to be excavated and either treated or disposed of properly. The chemicals of concern were lead and pesticides. A portion of the lead-impacted soil was considered to be a RCRA hazardous waste. Following a feasibility assessment it was assumed that excavation and offsite disposal at a licensed facility would be the best alternative. Based on the assumptions noted above and provided in Section 4.2.4, the estimated cost of the impacted embankment soil excavation and disposal is approximately $8.8 million. If the areas of concern are not excavated, the District does not need to perform clean up. Reuse of soil in areas of no hazardous material concern is discussed in Soil and Groundwater Management Plan.

At the City of San Jose property (Section 4.3.13), the District may acquire the property to create a wetland. The soils in this location are impacted with 4,4 DDT and its derivatives and mercury. Based on the assumptions discussed in Section 4.3.13, and if the District plans to excavate the property for construction, the estimated cost to remove the impacted soils to meet created wetland criteria on the site was approximately $7.1 million. If the District does not acquire the property there will be no impact on the project construction.

As noted above, five areas were identified where impacted groundwater may affect construction of channel modifications or raising the height of the levees if excavated. A unit cost for the treatment of dewatering groundwater for the reduction of metals and organics was estimated to range from $80,000 to $120,000 per month for a 60-gallon per minute flow rate.

2.0 INTRODUCTION

The Level II Hazardous Materials Investigation (Level II Investigation) was designed to delineate the extent of contamination in the areas of concern that may impact property acquisition, project construction and mitigation. This report describes drilling and sampling activities performed and presents the results of chemical analyses of soil and groundwater samples collected within and adjacent to the Project alignment. The work performed was developed in collaboration with the District. This section will present the overall picture of the District's Project including it's origins, objectives of the Project, and the procedures that were implemented to achieve the objectives.

2.1 Purpose and Objectives of Investigation

The purpose of the Level II Investigation was to delineate the extent of surface and subsurface contamination within and adjacent to the Project alignment, which could impact property acquisition or construction activities. The results of the work performed were used to recommend measures to reduce the short and long-term impacts of hazardous material contamination on property acquisition, construction and mitigation. Specific objectives of the work are described as follows:

- Confirm and delineate the extent of hazardous materials contamination in areas within the Project alignment that are known or suspected to impact the Project;
- Identify and evaluate the potential impacts of contaminant sources from adjacent properties to Project construction;
- Evaluate the impacts of hazardous materials contamination relative to property acquisition and construction of the Project;
- Develop, evaluate, and recommend cost-effective methods to avoid or reduce the generation of hazardous waste during Project construction;
- Evaluate and provide recommendations for Property acquisition and management of contaminated areas near and within the Project limits during construction;
- Provide recommendations on health and safety during construction;

- Evaluate and recommend remedial options for contaminated materials along with order of magnitude cost estimates; and
- Prepare a soil management plan to manage soil generated during construction.

2.2 Scope of Work

The Level II Investigation for the Project was performed in two phases. The initial phase included:

- Regulatory record review update of adjacent properties within ½ mile radius of the project limits between Highway 101 and Union Pacific Railroad (UPRR);
- Regulatory record review update of Reach A and adjacent properties within ½ mile radius (Highway 101 to 880);
- Sampling and analysis of soil and groundwater samples from embankments and river sediments of Reach A in areas where maintenance ramp and retaining walls are proposed;
- Sampling and analysis of soil and groundwater samples from embankments and river sediments between Reach A and UPRR;
- Sampling and analysis of soil and groundwater from adjacent properties of concern identified during the Level I Investigation;
- Sampling and analysis of soil and groundwater from supplemental properties that also may be acquired to meet Project requirements; and
- Assessment of additional locations or properties identified by the District as optional work.

After Phase I sampling was completed, flood control design concepts for the Project were defined by the District. Phase II work was performed to fill data gaps identified following the

Phase I work, considering the design concepts defined by the District. Phase II sampling work included:

- Additional sampling and analysis of sediments;
- Additional sampling and analysis of inboard embankment soils to fill data gaps;
- Additional sampling and analysis of levee materials adjacent to selected properties;
- Additional sampling and analysis of new properties that may need acquiring; and
- Collection and chemical analyses of soil samples from levee embankments along Reach A.

Tables 2-1, 2-2, and 2-3 summarize properties assessed, boring locations, sample depths, and chemical analyses performed for the Level I Investigation and Level II Investigation.

Investigative activities included performing a site reconnaissance of the individual properties and collecting surface and subsurface soil, and groundwater samples for quantitative chemical analyses. Chemical analyses were performed, as necessary, to confirm, delineate, and evaluate potential impacts of hazardous materials to property acquisition and construction. River embankments and river sediments were assessed to evaluate soil and groundwater characteristics and management alternatives for Project construction.

The above investigative activities focussed on properties and portions of properties that the District may need to acquire in fee or in easement. Particular attention was given to areas where the flood protection plan showed that material will be excavated and removed, if this information was available. This report presents the results for each property of concern in separate sections.

2.3 Limitations

This report was prepared in general accordance with accepted standards of care that exist in Northern California at the time the work was completed. It should be recognized that definition and evaluation of subsurface conditions are a difficult and inexact science. The scope of services described here is not intended to be inclusive, to identify all potential concerns, or to eliminate the possibility of environmental problems. With current technology, no level of assessment can show conclusively that a property or its structures are completely free of contaminated and/or hazardous substances. Therefore, Kleinfelder cannot offer a certification that the recommendations made in this report will clear any property of environmental liability.

The data points used during this investigation are necessarily limited due to economic and site constraints and should be viewed as generally, but not explicitly, representative of contamination likely to be associated with a site. Thus, Kleinfelder assumes no responsibility for the representation of the data as exact surface and/or subsurface conditions, but only for conditions at the sampling points. There is always the possibility that other contaminated areas exist in the materials and that they were simply not encountered during the limited soil sampling program.

During the course of the performance of Kleinfelder's services, contaminated materials were discovered. Our client or the property owner is solely responsible for notifying all governmental agencies, and the public at large, of the existence, release, treatment or disposal of any contaminated and/or potentially hazardous materials observed and/or detected at the Project site, either before or during performance of Kleinfelder's services. Kleinfelder will assume no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury which results from pre-existing contaminated and/or hazardous materials being encountered or present on the Project site, or from the discovery of such contaminated and/or hazardous materials.

Kleinfelder performed the investigative activities and evaluations in accordance with generally accepted standards of care that existed in Northern California at the time the work was performed. No warranty, expressed or implied, is made.

Conclusions and recommendations presented in this report are based on the results of the scope of work presented in Kleinfelder's workplan dated August 20, 1999. The scope of work includes the following:

- Drilling a total of 139 borings in Phase I sampling (July – October 1999) and 61 borings in Phase II sampling (September – October 2000);

- Quantitative chemical analysis of approximately 475 soil and 42 groundwater samples by Clayton Environmental Consultants and Sequoia Analytical (Phase I) and Chromalab (Phase II);
- Geophysical surveys completed by Cruz Brothers Inc.;
- Initial sample locations surveyed by the District Land and Survey Unit
- Records review update including regulatory agency communications and file reviews, and site database surveys provided by Vista Information Systems, Inc. (Vista);
- Reach A regulatory review update; and
- Field observations during reconnaissance of the project alignment and sampling of individual properties.

Only work described herein was performed. As such Kleinfelder cannot render opinions on issues not resulting directly from the work performed.

Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present. More extensive studies, including additional subsurface investigations, may reduce the inherent uncertainties associated with subsurface assessment. If the Client wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder should be notified for additional consultation.

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2.4 Background

2.4.1 Area Description

The current Project alignment extends from the Union Pacific Railroad (UPRR) crossing in Alviso (Station 7+000) southward to U.S. Highway 101 (Station 14+500). Reach A, included in this report, extends from U.S. Highway 101 (Station 14+500) south to Interstate 880 (Station 17+700). The east and west boundaries vary and include the levees or portions of adjacent properties contemplated for acquisition. District survey drawings showing all borings completed along the Lower Guadalupe River are included as Plate 5.1.a, .1.b, and 1.c.

2.4.2 Purpose and Objective of Flood Protection Project

The objectives of the Project are to restore one percent flood capacity of the river and develop a long-term solution to provide the necessary freeboard to meet the United States Army Corps of Engineers (CORPs) certification requirements for levee systems. Upon the completion of the downtown Guadalupe Project, the District will submit the Project plans to the Corps for Federal Clean Water Act, Section 104 certification. Upon completion of additional freeboard construction, the District will submit the plans to the Federal Emergency Management Agency (FEMA) for certification in order to remove the portion of the Lower Guadalupe River from Highway 101 to UPRR in Alviso from the 1- percent floodplain.

2.4.3 Previous Work

In support of the planning, design, and construction efforts of the current Project, the District has performed several studies concerning sedimentation, geotechnical parameters, cultural resources, and fisheries along the Lower Guadalupe River. District staff also performed a Level I Investigation (District, 1996) upon which this Project is partly based.

Work performed during the Level I Investigation included review of regulatory agency databases and historical aerial photographs, a site reconnaissance, and review of regulatory agency files for sites within 750 feet of the Project alignment that were suspected of potentially impacting the Project.

The regulatory agency databases reviewed were compiled by Vista. Vista identified 1,579 sites within 3.5 miles of the river that were either users of hazardous materials or have reported releases to the environment. Of these 1,579 sites, 94 were located within 750 feet of the Project alignment. Of the 94 sites located within 750 feet of the Project alignment 42 of them were eliminated because there was no evidence relating to the release of any hazardous substances to the environment and are not expected to impact the Project. This left 52 sites that were retained for further review.

The Level I Investigation (District, 1996) site reconnaissance was performed July 3 through 10, 1996. The Level I Investigation was completed by driving along the east and west levees to observe current (1996) conditions of the alignment and adjacent properties visible from the levees. As a result of the reconnaissance, 1 additional site was added to the list of sites for further review, bringing the total to 53 sites.

Regulatory agency files were reviewed for the 53 identified sites. Forty-four of these sites were eliminated due to limited impacts to the environment that did not appear to extend onto the Project alignment or because the site investigation/remediation activities had been completed and the sites had received closure from the regulatory agency providing oversight. The remaining nine sites included the following:

- Five Superfund sites located approximately 0.3-kilometer (km) (½-mile) from the Project alignment. The contaminants of concern at one of these sites were volatile organic compounds (VOCs); and
- Four properties used as landfills in the past. The report identified VOCs, semi-volatile organic compounds (SVOCs), petroleum hydrocarbons, metals, pesticides, herbicides, and asbestos as constituents of concern at landfill sites.

Historical aerial photographs were reviewed for 11 vacant sites located along the Project alignment. The vacant land between State Route 237 and the Alviso marina have been used as landfills in the past. Landfills and agricultural areas have been located between State Route 237 and U.S. Highway 101 along the Project alignment. Contaminants of concern at the agricultural sites are pesticides and herbicides.

A total of 20 sites (nine identified during the regulatory agency file reviews and eleven identified on historical aerial photographs) were recognized as properties of concern that should be further investigated for the Level II Investigation. These sites are summarized along with their constituents of concern in Tables 2-1, 2.2 and 2.3. The Level II Investigation addresses the concerns at these sites.

2.4.4 Proposed Construction

The District has hired a consultant to design the proposed Flood Control Project. The final design, which will specify the type of construction and specific areas where construction activities will occur, has not yet been completed. Design concepts for specific reaches of the river were made available to Kleinfelder following completion of Phase I activities. Phase II was modified based on this information. The types of activities that may be employed to increase channel capacity are briefly described as follows:

- Channel Modification – Inboard levee embankments may be cut and replaced with concrete walls and concrete aprons extending into the channel between the UPRR and Montague Expressway;
- Levee Heightening – The levee height may be increased within the District easement which may require the building of retaining walls or flood walls and excavating surrounding soil from depths ranging from 1 meter (m) to 6 m (3 feet to 20 feet) below grade;
- Sediment Management – The river channel may be excavated up to 4.6 m (15 feet) below the water surface to remove excess sediment buildup; and
- Bypass Channel Construction - A bypass channel at State Route 237 on the east side of the river; and
- Flood Wall Construction - Construction of flood walls along levees along selected reaches and construction of access ramps in Reach A.
- Vegetation Management – Periodic vegeation management activities will be performed between Highway 101 and UPRR. The goal is to balance the need for removal of flood control channel vegetation with the need to maintain and enhance ecological functions and values of the river.

2.5 Local Geology and Hydrogeology

2.5.1 Geographic Setting

The Guadalupe River is located in the Santa Clara Valley, which lies in the Coast Range province of central California. The valley is bounded by the Diablo Range to the east and by the Santa Cruz Mountains to the west and south. The southern portion of the San Francisco Bay occupies the northern portion of the valley.

The Guadalupe River is the principal drainage system for the central and western Santa Clara Valley between the San Tomas Aquino Creek drainage basin on the north and Llagas Creek drainage basin to the south. The river begins at the confluence of Guadalupe Creek and Alamitos Creek in south San Jose, approximately 0.3 km (½-mile) south of Blossom Hill Road. The river flows to the north for approximately 12.4 km (20 miles) before it empties into the San Francisco Bay at the Alviso slough. Over this distance the river flows through rural, suburban, urban, and industrial areas.

The river is confined to the floor of the Santa Clara Valley, with its tributaries draining the highlands of the Santa Cruz Mountains. Important tributaries of the Guadalupe River include Ross Creek, Canoas Creek, and Los Gatos Creek. The Guadalupe River drainage basin covers 44,000 hectares (170 square miles). This study focuses on the downstream reach of the river between Interstate 880 and the UPRR railroad crossing in Alviso.

The channel of the Guadalupe River cuts into the valley floor soils and sediments to depths ranging from 4.9 to 9.1 m (16 to 30 feet). Sands and gravels typically cover the riverbed.

2.5.2 Geologic Setting

The Santa Clara Valley is a large northwest-trending topographic and structural basin. Two major faults are present in the region, the San Andreas Fault in the Santa Cruz Mountains and the Hayward and Calaveras faults in the Diablo Range. Numerous smaller faults associated with the large regional faults are known or inferred in the mountains and beneath the valley floor.

Geologic materials in the valley may be broadly classified as older consolidated rocks exposed in the surrounding mountains and unconsolidated basin fill sediments. Sediments filling the basin are primarily derived from the surrounding mountain ranges. The vertical and lateral distribution of rock and sediment in the valley has been modified by syndepositional and postdepositional Cenozoic strike-slip and oblique-slip faulting and associated wrench folding (California Department of Water Resources, 1975).

The consolidated rocks form the bedrock in the region surrounding the Santa Clara Valley and beneath the valley floor. These rocks are generally encountered at depths ranging from 9.1 m (30 feet) below grade along the valley margins to over 457.2 m (1,500 feet) below grade beneath the valley floor. These rocks consist of marine clastic and carbonate sedimentary rocks, volcanic rocks, and metamorphic rocks such as serpentine. The rocks range in age from Jurassic to Late Tertiary.

Unconsolidated rocks are subdivided into the older Santa Clara Formation of Plio-Pleistocene age and younger valley fill alluvium of Pleistocene to Holocene age. The Santa Clara Formation is composed of alluvial materials (sands, gravels, and muds) eroded from the surrounding mountain ranges during their initial uplift and then folded and faulted.

The younger valley fill alluvium is comprised of sands, gravels, silts, and clays. Coarser grained materials, which are found at the valley margins and in buried stream channels, were deposited by a series of coalescing alluvial fans formed by streams draining the surrounding mountain ranges. The buried stream channels in the valley floor are set within fine-grained sediments. These buried channels appear to represent the ancestral locations of current streams, including the Guadalupe River (Sylvester, 1975). These channels have apparently been folded and faulted since deposition. Meandering streams in the valley floor deposited the finer grained materials. Near the San Francisco Bay, the fluvial sediments are interbedded with a blue-gray clay (Bay Muds) of probable marine origin. The marine clays were deposited with changes in the sea level.

The Project, located from Interstate 880 to the UPRR bridge, is set on Quaternary alluvium composed of gravel, sand, and clay. Based on the previous Level II Investigation completed for the upper Guadalupe River between U.S. Highway 101 and Interstate 880, shallow sediments are primarily composed of a thick sequence of silty and sandy clays, extending to a depth of approximately 18.3 m (60 feet) below grade. Discontinuous lenses (0.3 to 1.2 m [1 to 4 feet] thick) of coarser material also were present. A relatively widespread, continuous stratum of coarse-grained material was present at approximately the same elevation as the modern Guadalupe River streambed.

Based on our review of Soils of Santa Clara County (United States Department of Agriculture, Soil Conservation Service, 1968) the Guadalupe River flows through an area whose surface contains three different soil types along the alignment. These soils include: Tidal Marshland soils which occur from station 7+00 to 7+530; Sunnyvale/Castro/Clear Lake Association soils which occur from station 7+530 to 14+010; and Clear Lake/Campbell Association soils which occur from station 14+010 to 17+550.

2.5.3 Hydrogeologic Setting

2.5.3.1 Surface Water

The Guadalupe River, a perennial stream, has mean monthly stream flows (for the period between 1979 and 1981) ranging from near zero to 468 cubic feet per second (cfs) at the San Jose gauging station (USGS gauging station 111690000; Sylvester, 1986). The highest recorded flows typically occur during the wet season between October and April. The one percent flow is estimated to be 17,000 cfs (District, 1991). The overall gradient is 1.2 m per km on 13 fee per mile.

2.5.3.2 Groundwater

The Santa Clara Valley Groundwater Basin has been subdivided into an area of unconfined groundwater (the forebay) extending from the mountain fronts into the valley and a confined zone beneath the valley floor. Groundwater in the forebay is encountered under unconfined to semi-confined conditions. The recharge is from surface infiltration from rainfall, runoff, and irrigation. A significant amount of recharge occurs along the stream channels. Groundwater flow generally mimics surface topography, except where influenced by localized factors such as groundwater extraction and/or artificial recharge.

Groundwater in the central portion of the valley is divided into an upper unconfined and multiple lower confined aquifers separated by extensive regional aquitards. The aquitard between the upper unconfined aquifer and underlying confined aquifer ranges from 6.1 to 30.5 m (20 to 100 feet) thick and is typically encountered at depths of 30.5 to 76.2 m (100 to 250 feet) below grade (Iwamura, 1989). Additional discussion of deeper aquifers is not provided as this Project is addressing only soil and shallow groundwater.

Shallow perched water-bearing zones are encountered in localized areas across the valley. Along the stretch of the Guadalupe River between U.S. Highway 101 and Interstate 880 (Reach A), two water-bearing zones are reportedly present (Kleinfelder, 1995). The first, encountered at depths between 4.9 m (16 feet) and 9.1 m (30 feet) below grade, is unconfined to semi-confined. The groundwater flow direction in this water-bearing zone is typically toward the north to northwest. The deeper water-bearing zone, encountered at a depth of approximately 18.3 m (60 feet) below grade, appears to be confined and has a flow direction approximately paralleling the course of the Guadalupe River.

3.0 METHODOLOGY

This section presents the field methodology implemented to obtain the data necessary to meet the Level II Investigation objectives. Information presented in this section describes pre-field activities (such as permitting and underground utility clearance), soil boring methods and soil and groundwater sampling methodologies. Also, data validation and quality assurance/quality control (QA/QC) procedures are described. Detailed information on the field methodology can be obtained in a workplan titled "Final Workplan, Level II Hazardous Materials Investigation, Lower Guadalupe Flood Control Project, San Jose, Santa Clara County, California" dated August 20, 1999.

3.1 Pre-Field Mobilization Activities

3.1.1 Drilling Permits

No permits were required for this investigation because no borings on the Project extended beyond a depth requiring a permit by the District.

3.1.2 Permission to Enter

The District obtained permission to enter agreements with a majority of the property owners where work was planned. Most of the agreements called for advance notification of site work, which included notification regarding the type of work planned. Kleinfelder complied with the provisions of the permission to enter agreements for each property.

3.1.3 Underground Utility Surveys

Prior to advancing soil borings, Kleinfelder personnel visited the property to stake/mark the proposed boring locations and meet the facility contact (where possible) to discuss the location of underground utilities. Underground Services Alert (USA) was contacted after the field locations were staked/marked, and at least 48 hours prior to field mobilization. A private utility locator (Cruz Brothers) also was used to clear all locations prior to drilling. As a further precaution, areas of uncertainty were hand augered to a depth of 1.5 m (5 feet) prior to drilling.

3.2 Soil Boring Procedures

Before mobilization, staff reviewed the scope of work and the HASP, coordinated work to be performed with supervisors, assembled the necessary sample containers and sampling equipment, and checked, calibrated, and cleaned equipment to be used in the field.

3.2.1 Shallow Soil Sample Collection Procedures – Hand Auger

At locations where only shallow soil sampling was conducted, shallow samples were collected using a hand auger and slide hammer at depths ranging from a few centimeters (few inches) to 1.5 m (5 feet) below grade. The hand auger was used to extend a hole of approximately 10 cm (4 inches) in diameter to the desired depth. Sampling protocol consisted of driving a pre-cleaned, 5 cm (2-inch) diameter, 15 cm (6-inch) long stainless steel tube into the soil using a slide hammer; extracting the tube containing the soil/sediment from the channel or river; capping both ends of the tube with Teflon™ tape and non-reactive plastic end-caps, labeling the tube, recording the sample information onto a chain-of-custody (COC) form and placing the tube in an ice chest containing ice for delivery to the laboratory. All samples were transported under strict COC protocol.

Prior to sampling at each location, drilling and sampling equipment was decontaminated using a non-phosphate detergent solution followed by a double rinse with tap water. The shallow borings completed for the sediment assessment were backfilled with the soil cuttings. Sample locations were then marked with flagging to allow the sample points to be surveyed.

3.2.2 Subsurface Drilling and Soil Sampling Procedures

Deeper subsurface soil samples (greater than 1.5 m [5 feet] below grade) were collected using two types of equipment. In areas of archeological concern, soil borings were advanced by hollow stem or flight auger. Direct push drilling equipment was used where no archeological concerns existed. An experienced environmental geologist classified the soils, logged the lithology, and collected soil samples for possible laboratory analysis. Soil borings were flagged to allow the locations to be surveyed.

Soil samples collected with hollow stem or flight auger equipment generally were collected at approximate 1.5 (5-foot) depth intervals and at changes in lithology. Samples were collected by advancing the boring to a point immediately above the desired sampling depth and then driving a Modified California Split Spoon Sampler, lined with three pre-cleaned stainless steel tubes, into the undisturbed soil. The sampler was then removed from the bottom of the boring. Sampling protocol consisted of selecting the bottom tube, capping it at both ends with Teflon™ tape and non-reactive plastic end-caps, labeling the tube, recording the sample information onto a COC form and placing the tube in an ice-chest containing waster-based ice for delivery to the laboratory.

3.2.3 Field Measurements

For the protection of the drilling crew, an organic vapor meter (OVM) equipped with a photoionization detector (PID) was used to qualitatively screen the soil samples collected from the borings and obtain volatile concentrations in the breathing zone prior to and during drilling. The OVM measures ionizable compounds in air in parts per million by volume (ppmv). The OVM was calibrated and maintained following the manufacturer's instructions on a daily basis. Field calibration was performed using calibrated span gas. Ambient air was used to set the instrument zero. The calibration requirements were included in the complete HASP presented under separate cover.

In addition to the OVM, a combustible gas meter (CGM) was used to monitor for the presence of methane (CH_4) in potential landfill areas. Methane is a naturally occurring byproduct of decomposing organic material commonly associated with landfills. The CGM measures methane concentration as a percentage of the Lower Explosive Limit (LEL). During the field operations in potential landfill areas, methane measurements did not reach the 10 percent LEL field screening level. This requirement is included in the complete field HASP presented under separate cover.

3.2.4 Decontamination Procedures

To reduce the potential for cross-contamination, equipment used to penetrate the surface was steam cleaned prior to use. All equipment that came into contact with soil and/or groundwater was thoroughly cleaned prior to sample collection. Equipment typically requiring decontamination included: augers, direct-push casing, auger bits, sample barrels, and stainless steel sample liners. Equipment was cleaned by high-pressure steam cleaning and/or a non-phosphate detergent, such as Alconox™, and double-rinsed with deionized/distilled or potable drinking water.

3.3 Health and Safety Plan

Prior to beginning the fieldwork a HASP was prepared for the Project as a whole. This document, dated June 30, 1999, includes a list of protective measures required to protect the field investigation team, other authorized site personnel, and the general public; justifications to adjust the level of protection used as work progresses; a list of chemicals that could be encountered at one or more of the properties, including specific health concerns and warning properties; and emergency communication procedures. A hospital route map was prepared showing directions to the nearest hospital from all major roads along the Project alignment.

3.4 Sampling and Analysis Procedures

This section presents approved sampling procedures for collection of soil and reconnaissance groundwater samples, identifies laboratory procedures and methods, and outlines criteria for data validation.

3.4.1 Subsurface Soil Sampling Procedures

The selection of soil samples for laboratory analysis was based upon: 1) the Project objectives and requirements, 2) locations specified in the workplan (Kleinfelder, 1999), and 3) field observations such as lithology, odor, discoloration, or high moisture content. Generally, samples were submitted from the bottom of the boring, above and closest to the groundwater table, and from soil horizons with significant potential for contamination as specified in the workplan.

3.4.2 Reconnaissance Groundwater Sampling Procedures

Where groundwater sampling was to be performed, soil borings were advanced to a depth of approximately 1.5 m (5 feet) below the water table using direct push or hollow stem auger drill rig. In the event that water entered the boring at a slow rate, a 2.54 cm (1-inch) diameter polyvinyl chloride (PVC) casing with a 1.5 to 3.0 m (5- to 10-foot) screened interval was placed through the center of the casing. The drill casing or augers were then removed from the boring to allow groundwater to enter. If groundwater recharge was rapid, the groundwater sample was obtained directly through the drill casing using a small diameter disposable bailer. The groundwater sample was then decanted from the bailer into the appropriate laboratory sample containers, immediately capped, labeled, recorded onto the COC form and placed into an ice chest containing ice pending transport to the laboratory. The samples were transported under strict COC protocol.

3.4.3 Laboratory Analysis

Samples were collected in new laboratory-supplied containers. Samples to be analyzed for VOCs United States Environmental Protection Agency ([EPA] Method 8260) were collected first. The sample was slowly decanted into three 40 ml volatile organic analysis (VOA) vials with as little agitation as possible to reduce the potential loss of VOCs, and to avoid splashing the preservative. Bottles for VOC analysis were inverted to assure no air bubbles were present. Total petroleum hydrocarbon (TPH), SVOCs and pesticide samples were collected next. Samples submitted for metals analysis were placed in unpreserved containers (no acid) and filtered in (using a 0.45 micron filter) the laboratory and then acified. Containers were filled directly from the bailer, immediately capped, labeled and placed in an ice chest filled with ice.

Samples were labeled with a unique sample identification number, Kleinfelder's Project number, sample location, date and time of sample collection. Samples were transported via courier to the District's contract laboratories (Phase I) and to Chromalab (Phase II) under strict COC protocol.

Table 2-4 lists the analyses, containers, preservatives, and holding times for the samples collected. Samples were not left unattended unless they were placed in a secure refrigerator in a sample control area.

3.4.4 Data Validation and Analysis

The District designated the Project analytical laboratory during Phase I and Kleinfelder designated the laboratory during Phase II. The laboratories used were certified by the State of California to perform the requested analyses.

The following criteria were followed in reporting data analysis results:

- For each analytical method, the analytical laboratory reported all analytes as the detected concentration or as less than the detection limit. All samples with "out of control spike recoveries" being attributed to matrix interference were designated as such. Dilution factors, date of extraction, date of analysis, and practical quantitation limits were reported for each analyte and method;
- Reports of method blanks included all analytes for each analytical method. Analytical results for each sample were clearly associated with a particular method blank. Any chemical concentrations found in method blanks were reported;
- Surrogate spike recoveries were reported for all applicable methods. The report also specified the control limits for surrogate recoveries. Any out of control recoveries resulted in the sample being rerun once. If subsequent analyses resulted in "out of control recoveries" both results were reported and the data flagged;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries were reported for all analyses. All sample results were designated as corresponding to a particular set of MS/MSD analyses. MS/MSD analyses not meeting QC criteria were rerun once. If subsequent analyses resulted in out of control recoveries both results were reported and the data flagged. Only samples from this Project and from the specific site where work is performed were used for MS/MSD analyses. The laboratory did not use samples from other projects for MS/MSD analyses. The report also specified control limits for spike recoveries;
- Results for laboratory duplicates were reported with relative percent difference (RPD) limits for duplicate analyses;
- Laboratory Control Sample (LCS) results were reported with control limits for LCS analyses. Analytical results for each sample were clearly associated with a particular LCS sample;

- Results of continuing calibration analyses for all analyses were included in the data package. Continuing calibration results were organized such that sample results were clearly correlated with the calibration check samples that bracket the sample results;
- Draft certificates of analysis containing analytical results and preliminary QC data only were provided to the Project Manager or his/her designated representative as soon as they were available. Draft certificates of analysis did not have to satisfy all the requirements of this section, but contained basic QC information such as MS/MSD analyses, LCS analyses, method blank results, COC forms, and cooler receipt forms; and
- The final certificate of analysis contained a narrative section identifying samples not meeting QC criteria and any other out of control condition. The narrative described the corrective action taken. If "matrix effects" were invoked as a cause for out of control recoveries, a subsection of the narrative presented a detailed justification for this assertion and included a summary of all relevant QC data.

3.4.5 Investigation Derived Waste Management Plan

This section provides the procedures for handling Investigation-Derived Waste (IDW). The information provided includes label information, holding times, containers, handling procedures, and personal protective equipment (PPE). During Phase I, the District disposed of the IDW. For Phase II, Kleinfelder will select a waste hauler. A minimum of three bids will be obtained for waste hauling and disposal. The bidders will be provided with estimated waste quantities for both soil and water and expected concentrations.

3.4.5.1 Soil Cuttings

Soil cuttings generated during this sampling program were contained in U. S. Department of Transportation (DOT)-approved 55-gallon waste drums. All drums were clearly labeled as non-hazardous waste (pending analysis results) with labels that clearly stated the following:

- Matrix: Soil;
- Source: SB-1, MW-1, etc.;
- Start Date;

- Expected Removal Date: 90 days after the first day of accumulating waste;
- Owner: District;
- Contact: Ms. Shola Idowu or Mr. Paul Thomas;
- Address: 5750 Almaden Expressway, San Jose, California; and
- Phone Number: (408) 265-2600.

If analytical results indicated that soil from a specific boring should be classified as hazardous waste, the drum was re-labeled with a hazardous waste label and disposed of appropriately.

At the end of each field day, the drums were transported by truck to a secure waste storage area designated by the District. The drums will be temporarily stored in the designated area until disposal.

3.4.5.2 Decontamination Wastewater

Decontamination wastewater was placed in DOT-approved 55-gallon drums and labeled as described above. The drums were transported to the District designated storage area at the end of each field day. After review of analytical results, the wastewater will be disposed of as described above.

3.4.5.3 Personal Protective Equipment

PPE such as used gloves, Tyvek, or paper towels were placed in plastic bags for disposal in the trash.

3.5 Quality Assurance Quality Control

This section outlines Kleinfelder's Quality Assurance/Quality Control (QA/QC) procedures that were followed over the course of the Project.

3.5.1 Quality Assurance Objectives

QA objectives which were used for this Project included precision, accuracy, decontamination, completeness, correct holding times, and usefulness of reporting detection limits. These objectives are described in the Hazardous Materials Laboratory (HML) Users Manual (see references). Application and evaluation of these objectives followed the procedures that were presented in the HML Users Manual. The results of the data quality review are located in Section 4.8.

3.5.1.1 Precision

Precision is the measurement of random error. It is the degree of agreement between two or more measurements. It is most easily reported by calculation of the RJPD, which is calculated as the difference between measurements divided by the average of the measurements. Laboratory control sample results were used to determine the laboratory precision for each batch of samples.

3.5.1.2 Accuracy

Accuracy is the degree of agreement between a measurement and the true value. Accuracy is usually determined by creating a sample of known concentration, testing that sample, and comparing the measurement with the known concentration. Each batch of samples was tested for accuracy in the laboratory.

3.5.1.3 Decontamination

Laboratory method blanks were evaluated to assess the level of interference or contamination that exists in the analytical system and, which might lead to the reporting of elevated concentration levels or false positives. If target analytes were detected in method blanks, it may indicate that cross-contamination occurred between samples.

3.5.1.4 Completeness

Completeness, in its simplest form, is the degree to which the amount of information collected agrees with the amount planned for analyses. This measurement is presented as a percentage of requested analyses completed by the laboratory.

3.5.1.5 Correct Holding Times

The EPA has established holding times, which represent the maximum amount of time that can take place between when a sample is collected and when it is analyzed. There is a specific holding time for each analysis and sample matrix.

3.5.1.6 Usefulness of Detection Limits

Reporting detection limits for non-detect samples were evaluated for applicability to routine action levels. If the reporting detection limit was higher than the action level, the data is less useful.

3.5.2 Sample Custody

Field notes were recorded on daily field technician reports that were then filed in the Project file. Information to be recorded included at a minimum the Project name, Project number, date, sample location, weather, and name of sampler. Other information, which may be pertinent to the Project, was recorded, including any deviations from the standard procedures. Each page was signed upon completion.

A COC record accompanied collected samples. Each sample had its own unique sample identification number, sample location, date and time of collection, and appropriate preservative clearly labeled with a permanent marker.

The information described above, along with the analyses to be performed, was included on the sampling logs. COC forms included the following:

- Date and time of sample collection;

- Project number;
- Project name;
- Sample number;
- Analyses to be performed; and
- Signature of sampler.

3.5.3 Field Equipment Calibration Procedures

Preventative maintenance for QA purposes includes those tasks that must be periodically carried out to reduce downtime of the measurement systems. Field procedures for preventive maintenance included the following:

- Sufficient sampling equipment and materials were on hand;
- Sampling locations and procedures were identified and reviewed prior to fieldwork;
- Additional materials were on hand in case additional (unplanned) sample preparation was necessary. Such materials included sample containers, labels, caps, tape, and field data forms; and
- Critical spare parts were readily available.

3.5.3.1 Organic Vapor Meter

An OVM containing a PID was used to monitor the breathing zone of the on-site personnel. The OVM was calibrated each day per the manufacturer's instructions.

3.5.3.2 Combustible Gas Meter

A CGM was used to monitor the work area for flammable gas in areas known or suspected to have been used for landfill activities. The CGM was calibrated on a daily basis per the manufacturer's instructions.

4.0 RESULTS

This chapter includes a description of the work performed in each area investigated, presents results of chemical analyses and provides a discussion of the analytical results. Also, each section contains a description of feasibility results (as applicable), conclusions and recommendations.

In the following sections, the analytical results are compared with applicable standards. For soil, the primary standard used for comparison is the California Code of Regulations (CCR), Title 22 criteria for hazardous waste disposal. Groundwater results were compared to NPDES general waste discharge limits. Where NPDES discharge limits are not available maximum containment levels (MCLs) were used for general reference.

The criteria set forth in are the CCR Title 22 requirements are the Total Threshold Limit Concentrations (TTLCs), which are the total regulatory limit; and the Soluble Threshold Limit Concentrations (STLCs), which are the soluble regulatory limits, by which a waste can be designated as hazardous under California law. These criteria are established for most metals, some persistent pesticides and herbicides, some polychlorinated biphenyls, and some organic compounds. According to Title 22, any soil with the total concentration of a constituent exceeding its TTLC should be considered hazardous for the purposes of disposal. If the soil contains the constituent at a total concentration exceeding ten times its STLC, the sample should be reanalyzed for the soluble constituent. If the soluble result exceeded the STLC then the soil is considered hazardous for the purpose of disposal.

Title 22 does not list specific standards for most VOCs or SVOCs. However, the California Environmental Protection Agency (Cal EPA), California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), and Department of Toxic Substances Control (DTSC) has established some guidelines for remediation of soil impacted with these compounds. In general, soils containing at a greater than 1 milligrams per kilogram (mg/kg) total VOCs, or at a greater than 10 to 100 mg/kg of total SVOCs should be remediated. With respect to soil disposal, the concentrations of VOCs and SVOCs acceptable at any given disposal facility vary depending on the facility's permit and how the soil will be handled. The specifics of how soil that is impacted with VOCs and/or SVOCs will be handled for this Project will be presented in the Soil and Groundwater Management Plan to be prepared under separate cover.

Title 22 does not list specific standards for petroleum hydrocarbons. However, the RWQCB has established some standard guidelines for remediation of soil impacted with petroleum hydrocarbons. In general, soils containing at a greater that 10 to 100 mg/kg of gasoline, or at a greater than 1,000 mg/kg of diesel or heavier hydrocarbons, should be remediated. With respect to soil disposal, the concentrations of petroleum hydrocarbons acceptable at any given disposal facility vary depending on the facility's permit and how the soil will be handled. The specifics of how petroleum hydrocarbon impacted soil will be handled in this Project will be presented in the Soil and Groundwater Management Plan to be prepared under separate cover.

The Cal EPA DTSC has classified friable, finely divided, and powdered wastes containing greater than 1% asbestos as hazardous. If the total asbestos content in a soil exceeded 1% then the soil is considered hazardous for the purpose of disposal.

During construction groundwater may be encountered and dewatering discharge may be necessary. For the Project, the concern is how water generated through dewatering during construction should be managed. Dewatering effluent is usually discharged through a National Pollutant Discharge Elimination System (NPDES) permit issued by the local RWQCB. In this report groundwater data are compared with discharge criteria contained within San Francisco Bay RWQCB Order No. 99-051, NPDES No. CAG 912003, "General Water Discharge Requirement for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds and Revisions of Order No. 94-087, July 21, 1999". Metals discharge limits were developed assuming a discharge of 50 to 100 gallons per minute (gpm). Where discharge limits are not available groundwater data were compared with MCLs for drinking water as MCLs generally approximate the discharge limits. The specifics regarding groundwater management during construction will be addressed in the Soil and Groundwater Management Plan to be prepared under separate cover.

The following discussion of work completed and results obtained is organized as follows. The general investigations for river sediment and embankment soil borings are presented first (Sections 4.1 and 4.2). Section 4.3 presents the results for individual properties considered for acquisition that were identified in the Level I investigation for the Lower Guadalupe River prepared by the District. Section 4.4 presents the results for individual properties that were added for investigation during Phase I due to potential property acquisition. Section 4.5 presents the results of the properties added during Phase II due to potential property acquisition. Section 4.6 presents the properties for which planned work could not be completed due to access restrictions. Section 4.7 presents the results of work performed as optional work. Section 4.8 presents QA/QC data.

4.1 River Sediment Assessment

4.1.1 Work Performed

Kleinfelder drilled soil borings and collected samples from 48 locations as shown on Plates 1A through 1C. Chemical analytical data from the samples are summarized on Tables 4.1a through 4.1h.

On July 19, 20, 22 and 23, August 2 through 4, and October 1, 1999, during the Phase I sampling event, Kleinfelder drilled 37 soil borings with depths ranging from 1.5 to 4.5 m (5 to 15 feet) below ground surface (bgs). Additional soil samples were collected from five soil borings drilled on September 30, and October 1, 1999 in order to confirm the results of the metal concentrations reported in borings SS9+222E and SS12+732W, and to confirm the extent of pesticides reported in boring SS8+781E. These additional borings included: SS9+221E, SS12+730W, SS12+734W, SS8+778E and SS8+784E. Sampling was conducted randomly in sediment areas where excavation was expected during construction.

On October 16, 2000 during the Phase II sampling event, Kleinfelder drilled an additional four river sediment soil borings using a hand auger and collected soil sediment samples using a slide hammer in order to provide better spatial representation. The four additional borings include SS13+085E, SS13+745E, SS14+100E, and SS14+280W.

During sampling, an experienced environmental geologist classified the soil, logged the lithology (as indicated in Appendix A), and collected soil samples for possible laboratory analysis. Soil samples from the direct-push drill rig were collected in 2.54 cm (one-inch) diameter acetate liners. Samples collected with the hand auger were collected in 5 cm (two-inch) diameter brass tubes by driving a unused tube into the soil using a slide hammer. All samples collected were capped at both ends of the tube with Teflon^{TM} tape and non-reactive plastic end caps. The samples were labeled, and sample information was recorded onto a chain-of-custody form. The samples were then placed in an ice chest for delivery to the laboratory.

Groundwater samples were collected using a disposable bailer and then placed into laboratory prepared containers. Containers were immediately capped and placed in an ice chest filled with ice pending transportation to the laboratory for analyses. Samples retained for laboratory analysis were documented using a COC record.

Soil borings were marked with wood stakes and flagging to allow the locations to be surveyed by the District after conducting Phase I sampling and by Nolte Associates after conducting Phase II sampling. Survey accuracy for the X and Y coordinates was +/- 0.3 m (1-foot).

River sediment samples were collected during Phase I sampling at the following depth intervals to the maximum depth of the boring:

- 0.2 to 0.3 m (1.0 to 1.5 feet);
- 0.8 to 0.9 m (2.5 to 3.0 feet);
- 1.4 to 1.5 m (4.5 to 5.0 feet);
- 2.9 to 3.0 m (9.5 to 10.0 feet); and
- 4.4 to 4.6 m (14.5 to 15.0 feet).

River sediment samples obtained during Phase II sampling were collected at the same intervals up to a maximum depth of 1.5 m (5.0 feet).

To evaluate the concentrations of potential contaminants in river sediment, the soil samples were analyzed for the following constituents of concern:

- Title 22 Metals (EPA Method 6010/7000 series);
- Organochlorine Pesticides (EPA Method 8080); and
- Asbestos in borings downstream of Tasman Drive (samples collected to depths up to 1.4 to 1.5 m (4.5 to 5.0 feet).

4.1.2 River Sediment Sample Analytical Results

The following summarizes the results of analyses for soil samples collected from river sediment. A total of 172 samples were analyzed for metals, 132 samples were analyzed for pesticides, and

120 samples were analyzed for biphenyls (PCBs). Boring logs are presented in Appendix A. Analytical results are presented in Tables 4.1.a and 4.1.b.

Metals

The results of river sediment soil samples analyzed for Title 22 metals are presented in Table 4.1.a. The soil samples were analyzed for metals, and the concentrations in each soil sample were compared to their respective TTLCs and STLCs. Soil with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the California Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., is considered hazardous for waste disposal purposes).

Out of the 172 samples analyzed for metals, only one sample [SS08+781E-4.5 (82 mg/kg)] contained arsenic at a concentration above ten times the STLC. Soluble arsenic was not detected above the reporting limit in the same sample.

Total chromium concentrations reported averaged 46.8 mg/kg (geometric mean 44.8 mg/kg) in 163 samples. Total chromium concentrations ranged from 13 mg/kg to 93 mg/kg. No samples were reported to exceed the total chromium TTLC of 2,500 mg/kg.

Total lead concentrations reported averaged 23.3 mg/kg (geometric mean 12.9 mg/kg) in 161 samples. Total lead concentrations exceeded ten times the STLC of 5 mg/L in 15 samples of the 161 samples analyzed, with concentrations ranging from 55 mg/kg to 290 mg/kg. Two samples, SS08+781E-4.5 and SS12+150E-1, were analyzed for soluble lead and the concentrations detected are 0.68 mg/L and 1.69 mg/L, respectively. These results are below the STLC.

Total mercury concentrations averaged 3.1 mg/kg (geometric mean 0.74 mg/kg) in 170 samples. Total mercury concentrations in two samples, SS09+222E-4 and SS12+732W-1.0 (120 and 22 mg/kg, respectively), exceeded the TTLC of 20 mg/kg. Total mercury concentrations exceeded ten times the STLC of 0.2 mg/kg in 51 samples, with concentrations ranging from 2.01 mg/kg to

120 mg/kg. Sample SS12+734W-1, with a total mercury concentration of 7.66 mg/kg, was analyzed for soluble mercury and a concentration of 0.00101 mg/L was reported. Soluble mercury was not detected above the reporting limit in sample S11+55OE-1 or SS09+280W-2.5, but the reporting limit (0.5 mg/L) is higher than the STLC (0.2 mg/L). Out of 101 soluble mercury analyses of samples collected elsewhere along the Guadalupe alignment, only nine samples were found to contain soluble mercury and no samples were found to contain mercury in excess of the STLC. Consequently it is believed that the mercury in the sediments are likely not significantly soluble.

To confirm and further assess the mercury impacts in the areas of TTLC exceedances [SS12+732W (22 mg/kg at 1 foot) and SS9+222E (120 mg/kg at 4 feet)], a total of three additional soil borings were advanced as follows. Additional borings SS12+730W and SS12+734W were advanced flanking SS12+732W. Additional boring SS9+221E was drilled adjacent to SS9+222E.Soil samples were collected from borings SS12+730W and SS12+734W at depths of 1, 2, and 4 feet bgs, and analyzed for total mercury. Mercury concentrations reported in borings SS12+730W and SS12+734W ranged from 0.118 mg/kg to 7.66 mg/kg, which are lower than the 22 mg/kg originally reported from that location and less than the TTLC. Soil samples were collected from boring SS9+221E at depths of 4, 10, and 14 feet bgs and analyzed for total mercury. Mercury concentrations reported in soil samples collected from boring SS9+221E ranged from 0.262 mg/kg to 2.01 mg/kg, considerably lower than the 120 mg/kg originally reported from that location and less than the TTLC. Analyses of samples collected from SS9+221E did not confirm the presence of mercury above the TTLC in that location.

Other Title 22 metals were detected in sediment samples than those reported above, however these metals were all below their TTLC or ten times the STLC.

Pesticides and PCBs

Results of the river sediment soil samples analyzed for pesticides including PCBs are summarized in Table 4.1.b. Pesticides analyses were performed on 132 samples, and PCB analyses were performed on 120 samples. Pesticides and PCB concentrations in each soil sample were compared to their respective TTLCs and STLCs.

Aldrin was detected in one sample at a concentration of 0.0021 mg/kg. Arochlor 1254 and Arochlor 1260 were detected at concentrations ranging from 0.069 to 0.38 mg/kg and from 0.070 to 0.13 mg/kg, respectively. Delta-BHC was detected in one sample at a concentration of 0.00198 mg/kg, and Chlordane was detected in four samples at concentrations ranging from 0.0022 to 0.0968 mg/kg. Dieldrin was detected at concentrations ranging from 0.0022 mg/kg to 0.11 mg/kg in a total of nine samples. Endrin was detected at concentrations ranging from 0.0021 to 0.091 mg/kg in five samples. Endrin aldehyde was reported in one sample at 0.011 mg/kg. All of these detected pesticides and PCBs were below their respective TTLC and below ten times the STLC.

4,4-DDD was detected in river sediment at concentrations ranging from 0.0022 to 2.1 mg/kg in 44 samples. 4,4-DDE was detected at concentrations ranging from 0.002 to 0.49 mg/kg in 44 samples. 4,4-DDT was detected at concentrations ranging from 0.0022 to 0.51 mg/kg in 20 samples. The TTLC for the total concentration of 4,4-DDT and its breakdown products is 1.0 mg/kg, which was exceeded in one sample SS8+781E –4.5 (2.59 mg/kg at 4.5 feet). To confirm and further assess the impacts of 4,4-DDT and breakdown products in the area of SS8+781E two additional soil borings, SS8+778E and SS8+784E were advanced. Soil samples from borings SS8+778E and SS8+784E were collected at depths of 4.5, 9.5, and 14 feet bgs and analyzed for pesticides. No pesticides were detected in samples SS8+778E. In SS8+784E, 4,4-DDD, and 4,4-DDE were reported but at concentrations less than the TTLC and ten times the STLC.

4.1.3 Discussion

4.1.3.1 Extent of Soil Contamination

Data generated from the 48 river sediment soil sample locations indicates that pesticides and metals are present in the sediment along the Lower Guadalupe River alignment at concentrations generally below the TTLCs for the constituents reported. Mercury was found above the TTLC in 2 of 172 samples. Analysis for soluble mercury in samples along the alignment indicates that the mercury is not significantly soluble. In the two cases where mercury or pesticides occurred above the TTLC (SS12+732W-1 and SS09+222E-4) additional investigation near these borings could not confirm the concentrations above the TTLCs.

4.1.3.2 Impacts to Construction

Based on the information gained during this investigation it appears that pesticides and mercury are present in the river sediment below the TTLC and ten times the STLC. In the few cases where constituents are reported above the TTLC and ten times the STLC these concentrations could not be confirmed. If river sediment is to be excavated it is likely that it would not require special handling and excavated soil could be disposed at a landfill or reused for construction.

4.1.4 Feasibility Study Results

Due to the apparent limited impacts to soil by pesticides and metals, Kleinfelder does not recommend a feasibility study to manage river sediment. The management of sediment to be removed during construction will be discussed in the Soil and Ground water Management Plan to be prepared by Kleinfelder.

4.1.5 Conclusions and Recommendations

Based on the data obtained during the river sediment investigation, it is Kleinfelder's anticipates no significant environmental impacts to Project construction related to sediment chemical quality. The soil will not be classified as hazardous waste and will not require special handling.

Kleinfelder does not recommend any additional investigation for the river sediment at this time.

4.2 Embankment Soil Assessment

4.2.1 Work Performed

Embankment soil samples were collected from soil borings in 85 locations between Interstate 880 and the UPRR project limits as shown on Figures 1.a through 1.c.

Between August 19 and October 1, 1999 (Phase I sampling) and from September 25 to October 11, 2000 (Phase II), Kleinfelder drilled 42 and 43 embankment soil borings, respectively. Subsurface soil samples were collected using a direct-push drill rig. A hollow stem auger was used in landfill areas, as well as, areas of archeological concern. A hand auger was used in selected areas in Reach A between Highway 101 and Interstate 880. A total of 35 of these borings (identified with a "SEB" prefix) were drilled to characterize both the individual properties of concern along the alignment and the adjacent embankment. Results from these borings are reported both in this section and in their associated property's section.

Phase I Sampling

The embankment soil samples were generally collected at the following depth intervals to the maximum depth of the boring:

- 0.5 to 0.6 m (1.5 to 2.0 feet);
- 0.8 to 0.9 m (2.5 to 3.0 feet);
- 1.4 to 1.5 m (4.5 to 5.0 feet);
- 2.9 to 3.0 m (9.5 to 10.0 feet);
- 4.4 to 4.6 m (14.5 to 15.0 feet);
- 5.9 to 6.1 m (19.5 to 20.0 feet);
- 7.5 to 7.6 m (24.5 to 25.0 feet); and
- 9.0 to 9.1 m (29.5 to 30.0 feet).

Due to differences in recovery at some locations the specific sample depths vary, but are at approximately 1.5 m (5 feet) depth intervals below a depth of 1.5 m (5 feet) bgs. Borings EB8+135E (44 feet below top of the levee [TOL]), EB8+555W (44.5 feet below TOL), EB8+796W (44.5 feet below TOL), EB11+900W (39.5 feet below TOL), EB12+142W (39.5 feet below TOL) and EB12+517W (39.5 feet below TOL) were completed to greater depths because they were placed on top of the levee. Boring SEB9+910W also was completed at a greater depth (36 feet bgs) due to its location on a small ridge approximately ten feet away from the toe of the levee.

To evaluate the concentrations of contaminants in embankment soil, the soil samples were analyzed for the following constituents of concern:

- Asbestos (samples collected at depths of 0.2 to 0.3 m [1.0 to 1.5 feet], 0.8 to 0.9 m [2.5 to 3.0 feet] and 1.4 to 1.5 m [4.5 to 5.0 feet] in borings downstream of Tasman Drive [Station 7+008 to 9+222]);
- Pesticides by EPA Method 8080 (samples collected at three depths nearest to estimated depth of native soil); and
- Title 22 Metals by EPA Method 6010/7000 series.
- Total petroleum hydrocarbons as gasoline and diesel were analyzed on selected samples.

Initially, samples were analyzed for total concentrations of metals. When the total concentration exceeded ten times the Soluble Threshold Limit Concentration (STLC) but less than the Total Limit Threshold Concentration (TTLC) for an individual metal, the District selected samples with the highest concentrations for soluble metal analysis.

When the pesticides were reported in the analyzed samples, then the next deeper sample was analyzed for pesticides until the vertical extent of impact by pesticides was assessed.

Phase II Sampling

The second phase sampling was completed to confirm and/or delineate areas of reported impact and to provide a better spatial distribution of borings along the river. Also, Reach A was added to assess embankments in that area. For all embankment soil borings completed during the

Phase II sampling event (with the exception of borings in Reach A and at EB12+351W and EB12+681W) samples were collected at the same depth intervals as in Phase I up to a depth of 25 feet. Samples collected from EB12+351W and EB12+681W were collected at 1, 3 and 5 feet. All samples collected at 3 and 15 foot depths were submitted to the laboratory to be put on hold, pending the receipt of the results of overlying and underlying samples. These samples were analyzed only if the overlying or underlying analytical results indicated concentrations that exceeded TTLCs or ten times the STLC.

To confirm and delineate the extent of contaminants of concern reported at certain locations, samples were collected as follows:

Soil samples collected from borings EB7+200W, EB7+385W, EB7+535W, and EB7+675W were analyzed for total and soluble barium, cadmium, copper, lead, mercury, and zinc;

Soil samples collected from borings EB8+145W and EB8+165W were analyzed for total and soluble arsenic, lead and mercury, and

Soil samples collected from borings EB12+351W and EB12+681W were analyzed for three pesticide constituents of concern: 4,4-DDT, 4-DDE and 4,4-DDD.

During Phase II sampling, the embankment soil samples collected from borings EB7+550W, EB10+400E, EB11+000E, EB12+700E, EB13+900E, EB9+750W, and EB11+600W were analyzed for Title 22 metals, pesticides, asbestos, VOCs, SVOCs, and TPHd as diesel.

Reach A is located between U.S. Highway 101 southward to Interstate 880. (Plate 4.7.4). Reach A was not part of the original contract the District signed with Kleinfelder. On October 20, 1999, the District authorized Kleinfelder to conduct a Record Review Update of Reach A, so that the project limits could be extended to Hwy 880 from Hwy 101. The Record Review Update identified potential groundwater contamination from adjacent properties that may impact the project construction on the west bank of Guadalupe River. Groundwater samples were collected to confirm the presence of petroleum hydrocarbons possibly migrating from adjacent properties. Soil samples were collected to investigate potentially contaminated soil that may impact construction of ramps and or walls along the west bank of the lower Guadalupe River.

In Reach A nine borings, 14+450W, 14+625E, 15+200W, 15+575W, 15+775W, 16+025W, 17+025W, and 17+350W were advanced on the inboard embankments to depths of 5.0 feet below ground surface (bgs) using a hand auger and a slide hammer. Borings 15+350W, 15+600W, 17+250W, and 17+550W were advanced at the top of the inboard levee to depths of 20.0 feet bgs using a direct push rig.

Embankment samples drilled by hand auger were collected and submitted for analysis as described below:

0.2 to 0.3 m (0.5 to 1.0 feet) - Title 22 metals and pesticides; and

1.4 to 1.5 m (4.5 to 5.0 feet) - Title 22 metals and pesticides.

Inboard top of levee samples advanced by a direct-push rig were collected and submitted for analysis as described below:

0.2 to 0.3 m (0.5 to 1.0 feet) - Title 22 metals, pesticides and VOCs (for 17+250W only);

0.8 to 0.9 m (2.5 to 3.0 feet) - Title 22 metals and VOCs (for 17+250W only);

1.4 to 1.5 m (4.5 to 5.0 feet) - Title 22 metals, pesticides and VOCs (for 17+250W only);

2.9 to 3.0 m (9.5 to 10.0 feet) - Title 22 metals and VOCs (for 17+250W only), TPHd, and TPHg;

to 4.6 m (14.5 to 15.0 feet) - Title 22 metals and VOCs (for 17+250W only), TPHd, and TPHg; and

5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and VOCs for 17+250W only, TPHd, and TPHg.

The 3.0 and 15.0 foot samples collected from 15+350W, 15+600W, 17+250W, and 17+550W, were placed on hold and analyzed depending on the results of the overlying or underlying samples. The 3.0 and 15.0 foot samples were analyzed if chemicals detected in the overlying or underlying sample exceeded TTLCs or ten times the STLCs.

Proposed groundwater samples could not be collected from 15+350W, 15+600W, 17+250W, and 17+550W as no groundwater was encountered in the boreholes.

4.2.2 Embankment Soil Sample Analytical Results

The following summarizes the analytical results of embankment soil samples and groundwater samples collected from the inboard and outboard embankment, top and toes of the levees. Boring logs are presented in Appendix A. Analytical results are presented in Tables 4.2.a through 4.2.f.

4.2.2.1 Soil Results

Metals

Results of the 421 embankment soil sample analyses for Title 22 metals are summarized on Table 4.2.a. A total of 343 soil samples were analyzed for the full suite of metals and 78 soil samples were analyzed for selected metals. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered a hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC is further analyzed to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., is considered hazardous for disposal purposes). In the case of lead, total lead concentrations were compared to the current regulatory disposal limit (350 mg/kg). In California (as required under Assembly Bill AB2784) lead in excess of 350 mg/kg currently cannot be disposed in a landfill unless the landfill has had it's solid waste facility permit revised by the California Regional Water Quality Control Board. Below is a summary of the metals analytical results for the metals where reported concentrations were above the waste criteria noted above.

Total arsenic concentrations exceeded ten times the STLC in four of the 353 samples analyzed and no sample exceeded the TTLC. Arsenic was detected below its TTLC, at concentrations ranging from 1.1 mg/kg to 130 mg/kg in the remaining 329 samples. At three of the four sample locations [SEB8+700E-20 (70 mg/kg), SEB9+000E-20 (91 mg/kg), and SEB09+318-2.5 (93 mg/kg)], total arsenic concentrations did not exceed ten times the STLC in samples collected at depths above and below each sample that was found to contain arsenic at ten times the STLC. For the fourth sample in which the total arsenic detected exceeded ten times the STLC (EB8+145W-20 at 30 mg/kg), soluble arsenic was detected from the same sample at 6.6 mg/L, which exceeded the STLC. This sample also exceeded regulatory limits for lead. Finally, TCLP analyses was performed on the EB8+145W-20 sample and no soluble arsenic was detected indicating the sample would be a non-RCRA hazardous waste if excavated and disposed of.

One barium result (out of 359 samples analyzed) (1,300 mg/kg in sample EB07+300W-14.5) exceeded ten times the STLC, but the soluble barium concentration reported in the same sample (0.11 mg/L) did not exceed the STLC.

Cadmium concentrations exceeded ten times the STLC (1 mg/l), but not the TTLC (100 mg/kg), in three of the 360 samples analyzed, ranging from 14 to 24 mg/kg. Cadmium was detected below the TTLC and ten times the STLC in 36 samples.

Total chromium concentrations were not found to exceed the TTLC or exceed ten times the STLC in any of the embankment soil samples. The sample with the highest concentration of chromium (EB07+470W-19; 710 mg/kg) was analyzed for soluble chromium. This sample also contained lead and zinc above their TTLCs. Soluble chromium was not detected above the reporting limit in the sample. Two samples (14+625 E-5 and 15+200 W-1) were analyzed for hexavalent chromium. No hexavalent chromium was detected in the samples.

Total copper concentrations exceeded ten times the STLC in samples EB07+470W-19 (750 mg/kg) and EB7+550E-25 (370 mg/kg). Soluble copper was not detected in sample EB07+470W-19. Soluble analysis was not performed on sample EB7+550E-25 as the copper concentration was approximately half of that in the sample from EB7+470W-19 and no soluble copper was detected in that sample.

The TTLC for lead (1000 mg/kg) was exceeded in three samples [EB7+470W-19 (3800 mg/kg), EB7+471W-9.5 (1000 mg/kg), and EB7+550E-25 (20,000 mg/kg)], and ten times the STLC was exceeded in 32 additional samples out of 375 samples analyzed. Soluble lead was detected in 13 out of 27 samples, with three samples containing concentrations above STLC: EB07+301W-4.5 (8.37 mg/L), EB7+535W-5 (20 mg/l), and EB8+145W-20 (13 mg/L). Lead was detected in nine samples at concentrations exceeding the current regulatory disposal limit (350 mg/kg) (including the three samples noted above that exceeded the TTLC) for lead: EB7+300W-2.5 (640 mg/kg), EB7+301W-4.5 (360 mg/kg); EB7+470W-19 (3800 mg/kg), EB7+471W-4.5 (970 mg/kg); EB7+471W-9.5 (1000 mg/kg), EB7+550E-25 (20,000 mg/kg), EB7+600W-10 (530 mg/kg), EB7+600W-14.5 (350 mg/kg); and EB8+145W-20 (500 mg/kg). The TCLP test was run on the samples from EB7+550E-25 and EB8+145W-20 and soluble lead was reported at 0.41 and 0.64 mg/l, respectively.

Mercury was not detected in the embankment soil exceeding the TTLC. Mercury exceeded ten times the STLC in 149 of the 413 samples analyzed. Additional analysis revealed the presence of soluble mercury but at concentrations below it's STLC.

Two samples contained selenium concentrations below the TTLC but exceeding ten times the STLC in EB07+470W-19 (14 mg/kg) and EB12+142W-34.5 (20 mg/kg). Additional analysis indicate the absence of soluble selenium.

One zinc concentration, sample EB07+470W-19 (8,900 mg/kg), exceeded the TTLC. Additional analysis indicates the presence of soluble zinc at concentration of 4.4 mg/L, below STLC.

Pesticides and PCBs

Results of soil sample analyses for pesticides and PCBs are summarized in Table 4.2.b. Pesticides analysis was performed on 193 samples, and 139 samples were analyzed for PCBs. Pesticide and PCB concentrations in each soil sample were compared to their respective TTLCs and STLCs.

Arochlor 1260 was detected in three samples at concentrations ranging from 0.079 to 0.22 mg/kg, below TTLC and ten times the STLC. Chlordane was detected in one sample at concentration of 0.248 mg/kg, below the TTLC and ten times the STLC

The sum of concentrations of pesticide constituents 4,4-DDD, 4,4-DDE, and 4,4-DDT exceeded the TTLC in eight boreholes and samples as follows: SEB8+700-E-20, SEB9+000E-20, SEB9+318W-2.5, SEB9+812E-1, SB11+153E-1.5, EB11+501E-10.5, EB12+350W-1, SEB14+115W-2.5, and SEB14+228W-4.5. Samples collected at depths above and below the eight samples either contained concentrations of 4,4-DDT and its breakdown products at concentrations that were lower than the TTLC, or the compounds were not detected above reporting limits. The twelve soil samples collected from SEB11+495E and SEB11+505E for delineation of the results obtained at EB11+501E-10.5, were analyzed for total and soluble pesticides, yet none were detected above the reporting limits. Three soils samples were collected from SEB12+351W for confirmation of the results from EB12+350W; no pesticides were detected above TTLCs in samples from SEB12+351W.

Dieldrin was detected below TTLC and ten times the STLC in seven samples, with concentrations ranging form 0.0088 mg/kg to 0.23 mg/kg. Heptachlor was detected in four samples below the TTLC and ten times the STLC, at concentrations ranging from 0.0032 mg/kg to 0.0136 mg/kg. Heptachlor epoxide and 4,4-Methoxychlor were detected below TTLC and ten times the STLC in one sample at 0.0021 mg/kg and 0.013 mg/kg, respectively.

Volatile Organic Compounds

The Volatile Organic Compound (VOC) results for 90 soil samples are presented in Table 4.2.c. Acetone was detected in samples SEB07+055E-3 (0.054 mg/kg) and SEB07+055E-5 (0.055 mg/kg), and methylene chloride was detected in sample EB9+750W-10 (0.0061 mg/kg). No other VOCs were detected.

Semi-Volatile Organic Compounds

The semi-volatile organic compound (SVOC) results for 75 soil samples are presented in Table 4.2.d. Benzo(a)pyrene was detected in ten samples, ranging from 0.022 mg/kg to 0.06 mg/kg. Bis(2-ethylhexyl)phthalate was detected in one sample at 19 mg/kg. Phenol was detected in five samples collected from SEB07+140E and SEB12+140E, with concentrations ranging from 0.13 mg/kg to 0.23 mg/kg. No other SVOCs were detected.

Total Petroleum Hydrocarbons

The results of the 61 soil samples analyzed for total petroleum hydrocarbons as diesel (TPHd) and 51 soil samples analyzed for total petroleum hydrocarbons as gasoline (TPHg) are shown Table 4.2.e. TPH as gasoline (TPHg) was not detected in any of the 51 soil samples analyzed. TPHd was detected at concentrations ranging from 1 mg/kg to 40 mg/kg in 39 soil samples. TPHd was detected at concentrations of 250 and 310 mg/kg at locations SEB7+075E-15 and SEB07+098W-14.

Asbestos

Asbestos results for 44 soil samples are presented in Table 4.2.f. Asbestos was detected in one sample (trace amount, less than 1%), EB9+750W-25. Asbestos was not detected in any other embankment soil samples.

4.2.2.2 Groundwater Results

Metals

Results of 19 groundwater sample analyses for Title 22 metals are summarized on Table 4.2.a. Metals concentrations in each groundwater sample were compared to their respective NPDES discharge limits calculated assuming discharge rates of 50 and 100 gallons per minute (gpm). Below is a list of samples where groundwater metals concentrations exceeded calculated discharge limits:

			General NPDES Permit Discharge Limit Concentrations	
Metal	Groundwater Sample Location	Sample Concentration (mg/L)	At 50 gpm (mg/L)	At 100 gpm (mg/L)
Arsenic	SEB10+980W-W	0.015	0.011	0.0183
	SEB11+005W-W	0.022	0.011	0.0183
Chromium	SB10+864W-W	0.22	0.02	0.367
Copper	SB10+864W-W	0.16	0.022	0.0183
	SEB11+730W-W	0.099	0.022	0.0183
Lead	SEB12+900W-W	0.025	0.022	0.0183
Nickel	SB10+864W-W	0.23	0.11	0.0734
	SEB11+730W-W	0.17	0.11	0.0734
Zinc	SB10+864W-W	0.35	0.257	0.0366

Pesticides and PCBs

Results of the groundwater sample analyses for pesticides and PCBs are summarized in Table 4.2.b. Pesticide analyses were performed on 19 samples, and 12 samples were analyzed for PCBs. As no NPDES discharge criteria are available for pesticides and PCBs, pesticide and PCB concentrations in each groundwater sample were compared to their respective MCL, if established. Heptachlor was detected in sample SB10+864W-W at concentration of 0.000026 mg/L, which exceeds the MCL of 0.00001 mg/L. 4,4-DDE was detected in sample SEB07+010E-W at concentration of 0.000086 mg/L. A MCL has not been established for 4,4-DDE. No other pesticides or PCBs were detected.

Volatile Organic Compounds

The VOC results are presented in Table 4.2.c for 14 groundwater samples. 1,2-dichloroethane was detected in one sample (SEB12+715W-W) at a concentration of 0.00057 mg/L which exceeds the NPDES discharge limit (and MCL) of 0.0005 mg/L. Cis-1, 2-dichloroethene was detected in three samples at concentrations of 0.0102, 0.0043, and 0.0460 mg/L in borings

SEB10+864W, SEB10+980W, and SEB11+005W, respectively. The two highest cis-1,2-dichloroethene concentrations exceeded the NPDES limit discharge (0.005 mg/L). Tetrachloroethene and trichloroethene were detected in sample SB10+864W-W at 0.0159 mg/L and 0.0087 mg/L, respectively; both concentrations exceeded the NPDES discharge limit of 0.005 mg/L for both compounds. Vinyl chloride was detected in samples SEB10+980W-W and SEB11+005W-W at concentrations of 0.0027 and 0.0370 mg/L, respectively, exceeding the NPDES discharge limit of 0.0005 mg/L. Chlorobenzene and 1, 4-dichlorobenzene were detected in sample SEB7+098W-W at 0.018 mg/L and 0.009 mg/L, respectively which exceeds the NPDES discharge limit of 0.005 mg/L. Ethybenzene and zylenes were detected in sample SEB7+010E-W at 0.0085 mg/L and 0.023 mg/L, respectively, which exceed their respective NPDES discharge limit of 0.005 mg/L. Carbon disulfide, was detected in one sample (SEB11+005W-W) at a concentration of 0.0076 mg/L, exceeding the NPDES discharge limit of 0.005 mg/L.

Semi-Volatile Organic Compounds

SVOC results are presented in Table 4.2.d for 13 groundwater samples. Three SVOCs, were detected. In sample SEB07+098W-W, bis(2-ethylhexyl)phthalate and 4-methylphenol were detected at concentrations of 0.006 mg/L and 0.0180 mg/L, respectively, which exceeds the NPDES discharge limit for SVOCs is 0.005 mg/L 2,4-dimethylphenol was detected in sample SEB07+010E-W at 0.0055 mg/L, which exceeds the NPDES discharge limit for SVOCs is 0.005 mg/L.

Total Petroleum Hydrocarbons

TPH results are presented in Table 4.2.e for eight groundwater samples. TPHd was detected in three samples SEB7+098W-W, SEB12+140E-W and SEB13+303E-W, at concentrations of 2.4 mg/L, 0.180 mg/L and 0.120 mg/L, respectively. TPHd was not detected in the remaining five samples. TPHg was detected in one sample (SEB7+098W-W) at a concentration of 0.300 mg/L. TPHg was not detected in the four other samples analyzed. The TPH concentrations above exceed the NPDES discharge limit for TPH of 0.050 mg/L.

4.2.3 Discussion

4.2.3.1 Extent of Soil Contamination

Lead in concentrations exceeding the current regulatory disposal limit (350 mg/kg) or TTLC (1000 mg/kg) was detected in seven borings (between and including borings EB7+300W and EB7+600W) along the west embankment of the Guadalupe River between the Gold Street Bridge and State Route 237. Removal of lead impacted soils should be conducted prior to the project construction. Zinc was also detected in concentrations exceeding the TTLC in one of the lead impacted borings (EB7+470W) in this area. The embankment impacted by lead on the west bank is approximately 300 meters in length. Plate 4.1a show the approximate extent of lead impacted embankment soils along this reach of the river.

On the east bank, opposite the lead impacted west embankment, lead concentrations were found in concentrations up to 20,000 mg/kg in boring EB7+550E. As no other embankment borings were advanced within this reach of the east embankment it is not possible to estimate the extent of (or confirm) lead impacted soils there. Additional investigation may be required to delineate the extent of lead contamination in the area.

Lead was also detected in concentrations in excess of the TTLC and STLC in boring EB8+145W located on the west embankment, south of the Highway 237 bridge. Arsenic in excess of the STLC was also detected in this boring. A boring advanced to about 9 m (28 feet) located south of EB8+145W was not found to contain lead or arsenic in excess of TTLCs or STLCs. The down stream extent of the impacted embankment soils could not be assessed since no borings were drilled between stations 8+145 and 7+943 along the west bank. Boring EB8+145W is shown on both Plates 4.1a and 4.1b.

4,4-DDT and its breakdown products were found in concentrations exceeding the TTLC in eight samples collected from eight borings along the entire length of the river investigated. Specific locations are listed in the Pesticide and PCB section of Section 4.2.2.1.

TPHd in was detected in embankment soils at locations SEB7+075E-15 and SEB7+098W-14 at concentrations of 250 and 310 mg/kg, respectively. The concentrations of TPHd detected at the remaining 14 locations are insignificant and may not impact project construction or acquisition.

4.2.3.2 Extent of Groundwater Impacts

VOCs and SVOCs in excess NPDES discharge limits were detected in groundwater in embankment borings associated with the:

- Levee area adjacent to SCVWD property near Gold Street Bridge (ethylbenzene, xylenes and 2, 4 dimethylphenol)
- Levee area adjacent to Felton-Norborn property (chlorobenzene 1, 4 dichlorobenzene, bis(2-ethylheyl)phthlate, 4 methylphenol in groundwater from SEB7+098W);
- Levee area adjacent to State of California and Lick Mill properties (cis-1,2-DCE in SEB10+864W and SEB11+105W; PCE in SEB10+864W; TCE in SEB10+864W; Vinyl chloride in SEB10+980W and SEB11+005W), carbon disulfide in SEB11+005W; and
- Levee area adjacent to MacPhee-Barbieri property (1,2-DCA in groundwater from SEB12+715W).

The SCVWD/Felton-Norborn properties are shown in Plate 4.1a. The State of California and Lick Mill properties are shown on Plate 4.1e. The MacPhee-Barbieri property is shown on Plate 4.1g.

Metals were detected in groundwater associated with levee areas adjacent to the following properties:

- State of California property adjacent to the Lick Mill property on the north side (SEB10+864W [chromium, copper, nickel and zinc])
- Lick Mill property (SEB10+980W and SEB11+005W [arsenic])
- State of California property adjacent to the Lick Mill property on the south side (SEB+11+730W [copper nickel])
- Mac Phee-Barbieri (SEB12+900W [lead])

Heptachlor (0.000026 mg/L) and 4,4-DDE (0.00005 mg/L) were detected in excess of MCLs (no NPDES discharge limits are available) at the State of California property (SEB10+864W) and the SCVWD property (SEB7+010E).

TPHd or TPHg were detected in groundwater in embankment borings in excess of the NPDES discharge limits associated with the levee areas adjacent to the following properties:

- Felton-Norborn property (SEB7+098W [TPHg and TPHd]);
- Gibson and Kay Metals property (SEB12+140E [TPHd]); and
- Altos Computer property (SEB13+303E [TPHd]).

In many samples collected along the Guadalupe River alignment the laboratory reported that the TPHd chromatograms did not match the diesel standard. Other naturally occurring compounds may be reported in the diesel hydrocarbon range. Therefore, the General NPDES Permit discharge limits may not be applicable in these locations.

4.2.3.3 Impacts to Construction

Planned construction north of the Montague Expressway may consist of channel modification involving the excavation of the inboard embankment, to construct a wall and placement of structural material for the wall. The detection of lead and other metals in concentrations exceeding TTLCs and STLCs in embankment soils (i.e. the soils are considered hazardous for excavation and disposal) will necessitate special handling and treatment or disposal in the identified areas. The largest lead impacted area includes the west embankment from about 7+250 to 7+650. A high concentration of lead was also detected on the east bank opposite the area. The metal results from this east bank boring (EB7+550E) should be confirmed and the lateral extent of impacts on this bank assessed. Finally, lead and arsenic impacted soil was identified south of the State Route 237 bridge at EB8+145W. The northern extent of this impacted area should be identified.

Since the inboard embankment from Montague Expressway to UPRR may be excavated for construction of channel modification, the District may consider separating soil to be excavated from the five locations and sampling and analyzing the soil for pesticides before disposal. The locations are: EB8+700E; SEB9+000E; SEB9+318W; SEB9+812W, and EB11+501E. 4,4-DDD, 4,4-DDE and 4,4-DDT was not confirmed at boring EB12+350W-1. Pesticide impacted soil at the following locations may be removed and disposed of, only if the area will be excavated for construction: SEB14+115W; and SEB14+228W. The District may consider removing and disposing of shallow soil at the nine locations prior to construction in order to avoid exposing construction workers to the contaminants of concern. If the inboard embankment will not be excavated as proposed, then soil removal and disposal will not be necessary at these locations.

Inboard embankment soils may be excavated adjacent to the SCVWD and Felton-Norborn properties downstream of the Gold Street Bridge. Inboard embankment soils in these areas appear to have been impacted by petroleum hydrocarbons. In addition, groundwater appears to have been impacted by VOCs, pesticides and/or petroleum hydrocarbons at these locations. If the soil will be excavated for construction, the District should consider removing impacted soil for disposal at appropriate landfills. Dewatering operations associated with impacted soil removal and construction should include treatment of the groundwater to meet NPDES permit discharge criteria. The management of groundwater to be generated during construction will be discussed in the Soil and Groundwater Management Plan to be developed by Kleinfelder in the year 2001. Finally, inasmuch as the adjacent sites were historically used as landfills construction crews should be made aware that other unknown contaminants chemicals may be present in the soils underlying the embankments in these areas.

Groundwater impacts were identified in the levee area adjacent to the Lick Mill and State of California properties. Groundwater impacts include VOCs and metals exceeding calculated NPDES discharge criteria. Dewatering operations associated channel modification in these areas should include appropriate treatment of the impacted groundwater to meet permit discharge criteria.

Other embankment areas, south of the Montague Expressway, with groundwater impacts include embankments adjacent to the MacPhee/Barbieri properties, Gibson and Kay Metals property and Altos Computer System property. The extent of groundwater impacts in these areas is not known. Kleinfelder understands that levees may be raised in this area as part of the Project. If excavations are extended to the groundwater level, dewatering may be necessary and treatment prior to discharge will be required.

4.2.4 Feasibility Study

The feasibility study was performed assuming channel modifications would be made north of Montague Expressway and the levee would be raised south of Montague Expressway. As the design of the Project has not been finalized these design concepts may change. Embankment soils were found to be impacted with either pesticides, total metals, or soluble metals above TTLCs in a total of ten general areas along the Project area. The estimated extent of each of these areas is presented on Plates 4.1a through 4.1i, with cross-hatching depicting the areas believed to be impacted. To estimate the lateral extent, the assumption was made that the impacted soils extended half way between borings with impacted soils and non-impacted soils. To estimate the lateral extent, the assumption was made that the impacted soils extended half way between borings with impacted soils and non-impacted soils. In the case of soil impacts at EB7+550E no other embankment borings are located in the immediate vicinity, consequently, a nominal 100m extent was assumed for feasibility study purposes. Costs for additional sampling and delineation of extent are included in disposal cost estimates for these areas assuming further delineation may be desired in some areas.

Soils

Volume of Impacted Soils in Channel Modification Sections: From Station 7+000 to Station 12+000, the District may construct a channel modification which would involve a vertical wall of unknown material on the inboard side of each levee, with spread footings extending approximately 0.5 to 0.6 meters into native soils. The concrete wall would extend along the top of each levee, keying in to the top of levee toward the outboard edge. Kleinfelder encountered a total of ten areas with soils exceeding hazardous waste limits within the channel modification areas of the Project. These areas are summarized below.

Station 7+250W to 7+360W (total and soluble lead over hazardous waste limits);

Station 7+440W to 7+630W (total lead and zinc over hazardous waste limits);

Station 7+500E to 7+600E (total and soluble lead over hazardous waste limits);

Station 8+090W to 8+150W (total and soluble lead and arsenic over hazardous waste limits);

Station 8+595E to 8+800E (total pesticides over hazardous waste limits);

Station 8+950E to 9+050E (total pesticides over hazardous waste limits);

Station 9+050W to 9+535W (total pesticides over hazardous waste limits);

Station 9+630E to 10+110E (total pesticides over hazardous waste limits);

Station 11+080 to 11+230E (pesticides over hazardous waste limits); and

Station 11+495 E to 11+505E (total pesticides over hazardous waste limits).

The approximate volumes of excavated impacted soils exceeding hazardous waste concentrations for each area in the channel modification portion of the Project were calculated, based on the available design alternatives. Kleinfelder has estimated that approximately 49,160 cubic m of soil are involved in the above ten areas if the inboard embankment is to be removed for construction (Table 4.2g). Please refer to the table for calculation assumptions. This should be considered an order of magnitude estimate of the volume of impacted soils to be excavated on this portion of the Project.

Volume of Impacted Soils Along Levees in Remaining Reaches: From approximately Station 12+000 to Station 14+500, the District may to construct raised levees on the top of levees and on the outboard toes of levees. These would involve driving concrete piles into the top of the levee, and constructing retaining walls with spread footings on the outboard toe. Spread footings would extend up to 2.5 m into native soils. In the areas where raised levees may be constructed, Kleinfelder identified two areas with impacted soils above TTLC concentrations:

Station 12+160E to 12+230E (soluble lead and pesticides – levee area adjacent to Gibson and Kay Metals [4.4.6]); and

Station 13+575W to 13+605W (pesticides – levee area adjacent to Hurlbert Family Trust property [4.4.9]).

One additional area (Station 14+005 to 14+400W) with impacted soils above TTLCs along the embankment was identified. Discussion of this area is included in Section 4.3.13 (City of San Jose property). If the District plans construction in this area, proper management and disposal of these soils should be carried out.

The approximate volumes of impacted soil exceeding hazardous waste concentrations in the two areas listed above are estimated as follows. The chemical impacts are assumed to reside in native soils (i.e., not embankment soils). The spread footing excavation on the outboard toe was assumed to be approximately 3 m deep and 1.5 m wide (based on the District's preliminary design sketch dated 12/6/00), or approximately 5 cubic m per m of levee for each area. The total length of levees involved in the above two areas is 100 m, thus an estimated 500 cubic m of soil exceeding hazardous concentrations is involved. This total is added to the 49,160 cubic m from the channel modification portion, for a total of 49,660 cubic m of soil.

Resource Conservation and Recovery Act (RCRA) Disposal Issues: If a waste is found to be RCRA waste, then it must be treated to meet land disposal restrictions (LDRs) before disposal. This would most likely involve stabilization to immobilize soluble lead. In order to be land disposed, D008 (lead contaminated) RCRA-hazardous waste must also meet the universal treatment standards (UTS) for over 200 chemicals, codified in CCR Title 22 Sections 66268.40 and 66268.48. This requirement is noteworthy because 4,4-DDT, 4,4-DDE, and 4,4-DDD are among the UTS constituents. Treatment for these pesticides could require incineration at a cost of over $4,000 per cubic meter.

The UTS for each of 4,4-DDT, 4,4-DDE, and 4,4-DDD individually is 0.087 mg/kg. Contaminated soils, however, are eligible for alternative treatment standards under Phase IV LDR regulations recently codified in Title 40 Code of Federal Regulation (CFR) 268.49. This section allows treatment standards of ten times the UTS concentration for constituents in the contaminated soil (i.e., 0.87 mg/kg instead of 0.087 mg/kg).

States must formally adopt the Phase IV LDRs. If the state has not adopted these regulations a generator can apply to the state receiving the soil for a variance allowing them to meet the less stringent 0.87 mg/kg standard. Kleinfelder has assumed that any D008 RCRA-hazardous soil will not require treatment for pesticides. Pesticides will not on average exceed the RCRA-contaminated soil standard of 0.87 mg/kg.

Kleinfelder has reviewed the data for each of the ten areas of impacted embankment soils, and it *appears* that none of the lead-impacted areas currently slated for excavation contains 4,4-DDT, 4,4-DDE, or 4,4-DDD with average concentrations above 0.87 mg/kg.

Remedial Alternatives for Embankment Soils: Kleinfelder screened the technologies presented in Section 5, and developed a conceptual approach for remediation of impacted embankment soils at these properties. Because soils are to be excavated as part of the Project, in-situ treatment options are not considered. Excavated soils would need to be staged for treatment in an area available for storage of thousands of cubic meters of soil. Once excavated hazardous soils are hauled on a public highway, they must be received by a licensed hazardous waste facility. Therefore, a nearby treatment location (i.e., a staging/treatment site) would need to be permitted by the State of California. Permitting for an off-site facility for soil treatment was deemed not to be feasible as part of this Project. On-site treatment also was considered. Excavations in the channel modification sections are to take place in sensitive ecological habitat areas, thus large-scale stockpiling for on-site treatment was believed not to be feasible due to environmental impacts. Therefore, excavation and off-site disposal was selected as the most feasible remedial alternative for the project.

It has been assumed that the excavation work will be performed by a licensed hazardous substance removal contractor, and that soils will be hauled off site for disposal as either a RCRA waste for stabilization of lead only, California-hazardous waste (i.e., not RCRA waste), or Class II non-hazardous waste. Soils impacted with lead over 100 mg/kg will require analysis for soluble lead by the EPA's toxicity characteristic leaching procedure (TCLP). Soils with total lead over 50 mg/kg will require soluble lead analysis by STLC. If any TCLP-soluble lead exceeds 5.0 mg/L, then the soil is D008 RCRA-hazardous waste (see discussion above.)

To profile the soils for disposal additional soil samples will likely be required by the landfills to meet landfill permit requirements. At the District's option the additional samples can either be collected before excavation by drilling additional boreholes and collecting samples for analyses or samples can be collected for analyses from stockpiles after excavation. Additional boreholes drilled prior to excavation could serve to better define the extent of impacted soils. For the purpose of the feasibility study it was assumed that additional samples would be collected prior to excavation.

Two waste disposal brokers were called (Decon Environmental of Hayward and Philip Environmental Services of Benicia) for telephone quotes on transport and disposal costs for the various disposal options. Price quotes were virtually identical. Based on these companies' verbal quotes, the following transportation and disposal prices (including taxes) were used:

Class II non-hazardous waste - $42/ton at Altamont or Forward;

Class I non-RCRA (California hazardous) - $90/ton at Kettleman Hills;

Class I RCRA hazardous for lead stabilization - $260/ton at Kettleman Hills; and

Class I RCRA hazardous for lead stabilization - $90/ton at ECDC, Utah (by rail car).

With the above assumptions, the estimated cost for excavation, transportation and disposal of 49,160 cubic meters of soil from the twelve areas described above is apparently $8.8 million (see Table 4.2.4h).

If substantial volumes of soil are found to be RCRA hazardous (>5 mg/L TCLP) then transportation by rail to ECDC in Utah would be more cost-effective than trucking to Kettleman Hills, California. The cost savings would be offset partially by costs associated with locating and constructing a rail car loading area. This would involve construction of a concrete containment pad for loading rail cars along a rail spur in the vicinity of the Project.

Groundwater

Groundwater impacts may affect the project if excavations extend into saturated soils. Such excavations would need to be dewatered by pumping from well points (preferred) or pumping directly from excavations. Groundwater is not accepted for discharge to the San Jose Santa Clara Water Pollution Control Plant because of capacity issues. Therefore, the only viable option for groundwater is either reuse, or discharge to surface water (i.e., the Guadalupe River) via a NPDES permit.

The depth to groundwater underlying levees in most areas explored ranged from about 1.5 m (5 feet) to about 3 m (10 feet) below toes of levees. Groundwater underlying the levee in one area was identified as problematic for channel modification improvements (Station 10+830W to 11+070W, Lick Mill Apartments). Depth to groundwater at this site is not known with certainty as discussed in previous sections; additional investigation is recommended to assess groundwater depth at each specific property with impacted groundwater.

For the purposes of this feasibility study, it has been assumed that groundwater impacts underlying the levee at the Lick Mill property will be managed during construction. Estimated costs have been calculated for extracting, treating and discharging groundwater to the river. Prices at this location can be considered representative of other areas where groundwater impacts will require treatment of groundwater before discharge.

Groundwater Extraction: Kleinfelder has observed on similar excavation dewatering projects that high sediment loading into groundwater treatment systems is problematic for removal of organics from water. Organics adsorb to fine silt particles and pass through granular activated carbon vessels, which are intended only for removal of dissolved organics. This results in exceedances of discharge limits. Therefore, it is imperative that silt in groundwater be removed before treatment. This can be accomplished in at least two ways. Firstly, dewatering can occur through well points (temporary groundwater extraction wells). If properly constructed and developed, well points will generate clear, nearly sediment-free water. This is the preferred groundwater extraction method, and is the basis for our costs in Table 4.2i. The second method for groundwater extraction is direct pumping from an open excavation. While this method is simpler from the planning and construction viewpoint, this method results in very high sediment in the extracted groundwater. If this method is employed, groundwater will need to be pretreated with a large filter to remove the silt. Typically this is accomplished with a plate and frame filter press, with filter plates loaded with diatomaceous earth.

Discharge Limits: An NPDES permit will dictate site specific or general permit limits for each discharge. Kleinfelder anticipates that an NPDES permit will be issued under the general NPDES permit program (permit number 99-051). A groundwater extraction and treatment system discharging to the Guadalupe River would be required to meet more stringent discharge limits than MCLs for metals, based on RWQCB mass loading limits. For example, arsenic loading will be limited to 3 grams per day in a flow range of 10 to 100 gallons per minute. This equates to a limit of about 0.009 mg/L for arsenic at a 60 gpm flow rate, compared to an MCL of 0.05 mg/L. We have assumed that NPDES discharge limits in the general permit will apply for VOCs.

Groundwater Constituents: Groundwater underlying the levee at the Lick Mill property appears to be impacted with chlorinated solvents (cis-1,2-dichloroethene and vinyl chloride) and exceeds discharge limits for arsenic.

Groundwater Treatment System: Treatment technologies presented in Section 5 were screened for effectiveness (both in terms of cost and feasibility) regarding treatment of water prior to discharge. An emphasis was placed on technologies that are reliable, portable and temporary for on-site treatment operations. The treatment system selected for removing metals and VOCs based on the screening process involves a treatment train approach as follows. A cartridge filter would remove trace amounts of sediment from the groundwater. This would be followed by three granular activated carbon vessels in series with coconut based carbon for removal of organics. Lastly, metals removal would be accomplished with two ion exchange beds, one with an arsenic specific resin and one cationic ion exchange unit in series. These systems are readily available for rental or purchase. Carbon and ion exchange resin would require removal and regeneration at the end of the treatment project.

Unit Costs for Treatment: Table 4.2i shows treatment costs for groundwater underlying the levee at the Lick Mill property. Costs are presented in a range of lower and higher estimates. Kleinfelder estimates that, at an assumed flow rate of 60 gallons per minute and one month duration, groundwater treatment and discharge would cost approximately $80,000 to $120,000. Please refer to Table 4.2i for costing assumptions regarding equipment sizing, number of well points for dewatering, and other technical issues. These costs are appropriate for use in estimating order of magnitude costs at other sites where groundwater flows and impacts are similar. All costs are incremental additional costs due to environmental impacts for construction.

4.2.5 Conclusions and Recommendations

Based on the data obtained during this investigation, chemically impacted embankment soils and/or native soils underlying embankments exist in the following locations which may impact the Project:

Station 7+250W to 7+360W (total and soluble lead over hazardous waste limits);

Station 7+440W to 7+630W (total lead and zinc over hazardous waste limits);

Station 7+500E to 7+600E (total and soluble lead over hazardous waste limits);

Station 8+090W to 8+150W (total and soluble lead and arsenic over hazardous waste limits);

Station 8+595E to 8+800E (total pesticides over hazardous waste limits);

Station 8+950E to 9+050E (total pesticides over hazardous waste limits);

Station 9+050W to 9+535W (total pesticides over hazardous waste limits);

Station 9+630E to 10+110E (total pesticides over hazardous waste limits);

Station 11+495E to 11+505E (total pesticides over hazardous waste limits);

Station 12+160E to 12+230E (soluble lead and pesticides over hazardous waste limits – levee area adjacent to Gibson and Kay Metals);

Station 13+575 to 13+605W (pesticides over hazardous waste limits – levee area adjacent to Hurlbut Family Trust); and

Station 14+005 to 14+400W (pesticides and mercury over hazardous waste limits – levee area adjacent to City of San Jose property).

Given the chemical concentrations found, the soils in these areas should be considered hazardous for excavation and disposal purposes and consequently, excavation work in these areas should be performed only by a properly licensed hazardous substance removal contractor.

The extent of impacts were estimated based on the locations of boreholes. Further refinement of the extent in many areas is possible. Also, further assessment will likely be needed for hazardous waste profiling and disposal purposes as discussed previously. It has been assumed that RCRA-hazardous soils are present in only one location. In order to verify this assumption to the satisfaction of disposal sites, additional sampling and analysis of actual soils for disposal needs to be conducted in each impacted area identified. Analyses may include, at a minimum, total lead, WET soluble lead, TCLP soluble lead, and pesticides as discussed previously. At the District's option, in certain locations soil can be excavated, stockpiled and sampled prior to disposal. In other locations the District may, prior to excavation, perform additional characterization to further assess the extent of hazardous versus non-hazardous soils in the embankment soils (e.g. in vicinity of EB7+550E).

Kleinfelder recommends that the District further investigate the depth to groundwater underlying the levee in the vicinity of the Lick Mill State of California, MacPhee-Barbieri, SCVWD, Felton Norborn, Gibson and Kay Metals and Altos Computer (see Section 4.2.3.2) properties in an effort to ascertain whether dewatering will be required. In addition the District should consider groundwater results for the individual properties prior to excavation of embankment soils when groundwater may be exposed in those areas. If groundwater will be exposed in areas of planned construction Kleinfelder recommends that treatment of discharge water be carried out prior to discharge under an appropriate permit. Excavation of soils in summer and fall months may reduce the potential to encounter groundwater in excavations.

Excavation of embankments and dewatering, treatment and disposal of groundwater in impacted areas should follow guidelines in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

Once construction begins, the District should request copies of all laboratory reports from waste characterization sampling, manifests from waste shipments, and laboratory results from post-excavation confirmation sampling.

4.3 Properties Identified During the Level I Hazardous Materials Investigation

4.3.1 Station No. 7+008E to 7+108E and 7+122E to 7+210E – SCVWD and Sainte Claire Corporation (APN 15-41-006 and 15-04-015)

The District and Sainte Claire Corporation (St. Claire) properties are located adjacent to the east bank of the Guadalupe River near Gold Street in Alviso (Plate 4.3.1). Prior to the development of the design alternatives, the district proposed to acquire the Saint Claire property for project construction. Since the design alternatives have been identified, the District is no longer considering the property for acquisition. The District property (APN 15-41-006) may be completely excavated for construction of the river channel.

4.3.1.1 Work Performed

The properties were identified as an area of concern during the Level I Investigation (District, 1996) due to their past use as a landfill. A reconnaissance of the properties was performed on September 1, 1999. The property with assessor's parcel number (APN) 15-41-006 was observed to be vacant. Parcel APN 15-41-006 is owned by the District and is part of the project area to be excavated thus five soil borings were installed on the SCVWD property. Parcel APN 15-04-015 is owned by Sainte Claire Corporation. Two borings were drilled on the Sainte Claire Property.

Phase I Samping

Three soil borings (SEB7+010E, SB7+050E and SB7+105E) were advanced at the outboard toe of the levee on parcel APN 15-41-006 on September 9, 1999. These borings were completed at a depth of 20.5 feet bgs. A hollow stem auger was used to advance the borings because the parcel is located within an identified archeological area. Two additional borings, SEB7+140E and SB7+193E, were completed to a depth of 21 feet bgs by direct-push methods on parcel APN 15-04-015 on September 15, 1999. The boring logs are presented in Appendix A.

Soil encountered in the borings consisted primarily of clay and sandy clay and clayey sands and gravels. Bits of metal, porcelain and glass were encountered to a depth of approximately 13 feet bgs in the borings on parcel APN 15-41-006. At 14 feet bgs, a layer of organic material was encountered in the borings on parcel APN 15-41-006. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – VOCs, SVOCs, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – VOCs, SVOCs, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - VOCs, SVOCs, Title 22 metals, TPHg and TPHd (borings SEB7+140E and SB7+193E only) and asbestos.

Groundwater samples was collected from borings (SEB7+010E, SB7+050E, SB7+140E and SB7+193E) and submitted for analysis of metals, pesticides, VOCs, and SVOCs. A sample was not collected from boring SB7+105E because an adequate volume of water could not be recovered. Groundwater samples for Title 22 metals and pesticide analyses were collected and placed on hold pending soil analytical results. The groundwater samples from borings SEB7+140E and SB7+193E also were analyzed for TPHg and TPHd.

Phase II Sampling

On September 28 and October 2, 2000, Kleinfelder drilled two soil borings on parcel APN 15-41-006 to confirm and delineate the extent of asbestos, metals, and VOC detected the outboard toe of the levee on APN 15-41-006. SEB7+055E was completed on September 28, 2000 by hand auger to a depth of 1.5 m (5 feet bgs) on the river bench. SEB7+075E was completed on October 2, 2000 at the inboard toe of the levee by hollow stem auger to a depth of 4.5 m (15 feet) bgs. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – VOCs, pesticides, Title 22 metals, TPHg and TPHd (boring SEB7+075E only) and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – VOCs, Title 22 metals, and asbestos (SEB7+055E only);
- 1.4 to 1.5 m (4.5 to 5.0 feet) – VOCs, pesticides, Title 22 metals, TPHg and TPHd (boring SEB7+075 only) and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet, SEB7+075E only)-VOCs, Title 22 metals, TPHg, TPHd and asbestos; and
- 4.4 to 4.6 m (14.5 to 15.0 feet, SEB7+075E only) VOCs, Title 22 metals, TPHg, TPHd and asbestos.

4.3.1.2 Analytical Results

The following summarizes the results of analyses of 25 soil and two groundwater samples collected from the District property. In addition the following sections summarize the results of twelve soil and two groundwater samples were collected from the Saint Clarie property. The analytical results are presented in Tables 4.3.1.a to 4.3.1.f.

4.3.1.2.1 Soil

Metals

Results of soil samples analyzed for Title 22 metals are summarized on Table 4.3.1.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous for disposal purposes).

SCVWD Property

Arsenic was detected in all soil samples in concentrations ranging from 1.6 to 18 mg/kg on the SCVWD property. Barium, cobalt, and copper were detected in all samples at concentrations ranging from 34 to 290 mg/kg, 6.5 to 12 mg/kg, and 21 to 47 mg/kg, respectively. Beryllium and cadmium were detected from 0.5 to 0.59 mg/kg and from 0.55 to 1.4 mg/kg, respectively.

Chromium concentrations ranged from 34 to 66 mg/kg. Lead was detected in all samples, ranging from 5.1 to 56 mg/kg. Lead exceeded ten times the STLC in one sample, SB07+050E-2.5 at 56 mg/kg. Mercury detections ranged from 0.058 to 6.2 mg/kg. The concentrations in two samples exceeded ten times STLC for mercury. Soluble (STLC) analyses were not performed for samples from the property because the analytes were not expected to be soluble at concentrations that will exceed the STLC.

Vanadium and zinc were detected in all samples, with concentrations ranging from 27 to 43 mg/kg and 41 to 170 mg/kg, respectively.

Sainte Claire Property

Arsenic was detected in all soil samples, in concentrations ranging from 2.3 to 8.8 mg/kg on the Sainte Claire property. Barium, cobalt, and copper were detected in all samples at concentrations ranging from 43 to 390 mg/kg, 6.4 to 11 mg/kg, and 17 to 41 mg/kg, respectively.

Total chromium concentrations ranged from 29 to 62 mg/kg. Lead was detected in all samples, ranging from 4.8 to 40 mg/kg. Mercury detections ranged from 0.057 to 9 mg/kg. The concentrations in seven samples exceeded ten times STLC for mercury. Soluble (STLC) analyses were not performed for samples from these properties because the analytes were not expected to be soluble at concentrations that will exceed the STLC.

Vanadium and zinc were detected in all samples, with concentrations ranging from 23 to 41 mg/kg and 37 to 130 mg/kg, respectively.

Pesticides and PCBs

Analytical results for pesticides and PCBs are presented in Table 4.3.1.b.

SCVWD Property

A total of 13 soil samples from these properties were analyzed for pesticides and PCBs from the District property. Dieldrin and Endrin were detected in sample SB7+050E-1.5 at 0.0043 mg/kg and 0.0054 mg/kg, respectively. 4,4-DDD was detected in three samples, ranging from 0.0036 to 0.03 mg/kg. 4,4-DDE was detected in ten samples, ranging from 0.0026 to 0.033 mg/kg; and 4,4-DDT was detected in four samples from 0.0044 to 0.039 mg/kg. TTLCs were not exceeded for any pesticides. No PCBs were detected in any of the samples.

Sainte Claire Property

A total of six soil samples from these properties were analyzed for pesticides the Sainte Claire property. 4,4-DDD was detected in four samples, ranging from 0.0066 to 0.088; 4,4-DDE was detected in five samples, ranging from 0.0046 to 0.042 mg/kg; and 4,4-DDT was detected in three samples form 0.013 to 0.037 mg/kg. TTLCs were not exceeded for any pesticides. No PCBs were detected in any of the samples.

Volatile Organic Compounds

Analytical results for VOCs are presented in Table 4.3.1.c.

SCVWD Property

All 25 soil samples from SCVWD were analyzed for VOCs. Acetone was detected in two samples from location SEB07+055E (0.054 mg/kg at 3 feet and 0.055 mg/kg at 5 feet). No other VOCs were detected.

Sainte Claire Property

All 12 samples from the Sainte Claire property were analyzed for VOCs. No VOCs were detected.

Semi-Volatile Organic Compounds

Analytical results for SVOCs are presented in Table 4.3.1.d.

SCVWD

A total of 18 soil samples collected from District property were analyzed for SVOCs. Benzo(a)pyrene was detected in three samples, ranging from 0.033 to 0.073 mg/kg. Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in sample SB07+150E-2.5 at 0.1 mg/kg, 0.11 mg/kg, and 0.11 mg/kg, respectively. No other SVOCs were detected.

Sainte Claire Property

A total of 12 soil samples collected from Sainte Claire property were analyzed for SVOCs. Benzo(a)pyrene was deteced in two samples, ranging from 0.027 to 0.06 mg/kg. Phenol was detected in boring SEB7+140E (0.13 mg/kg at 4 feet, 0.15 mg/kg at 9.5 feet, and 0.15 mg/kg at 19 feet). No other SVOCs were detected.

Petroleum Hydrocarbons

Petroleum hydrocarbon analytical results are presented in Table 4.3.1.e.

SCVWD Property

Four soil samples were analyzed for TPHg and TPHd from the District property. TPHd was detected in samples collected from SEB7+075E located on District property as follows: 2.7 mg/kg at 1 foot, 3.8 mg/kg at 5 feet, 3.3 mg/kg at 10 feet, and 250 mg/kg at 15 feet. The analytical laboratory reported that the TPHd chromatograph pattern was within the diesel range, however the chromatogram did not match a characteristic diesel standard. TPHg was not detected in any of the samples analyzed.

Sainte Claire Property

Nine soil samples were analyze for TPHg and TPHd from the Sainte Claire property. Soil samples collected from borings SEB7+140E and SB7+193E contained TPHd to depths of 4 feet at concentrations up to 17 mg/kg. The deeper samples (9.5,14.5 and 19 feet below grade) were not analyzed in boring SEB7+140E.

Asbestos

Analytical results for these 32 samples are presented in Table 4.3.1.f.

SCVWD Property

A total of 20 soil samples were analyzed for asbestos from the SCVWD property. Asbestos was not detected or less than 1 percent in all of the 20 soil samples collected from SCVWD property.

Sainte Claire Property

A total of 12 soil samples were analyzed for asbestos from the Sainte Claire property. The soil sample collected from SB7+193E-4 contained 2% asbestos (1% crocidolite and 1% chrysotile at 4 feet) which exceeds the TTLC of 1%. Less than 1% total asbestos content was detected in other samples from boring SB7+193E and from boring SEB7+140E.

4.3.1.2.2 Groundwater

Ground water was encountered between approximately five and 14 feet bgs in borings in the vicinity of the levee on District property. Groundwater was detected at 3 feet depth in boring SEB7+055E on the river bench. Groundwater was encountered at approximately five foot depth on Sainte Claire property. The following sections summarize the results of analyses of the four groundwater samples. Complete analytical results are presented in Tables 4.3.1.a to 4.3.1.e.

Metals

Analytical results for metals analyses of groundwater samples are presented in Table 4.3.1.a. Barium, cobalt, molybdenum, nickel and zinc were detected in groundwater samples from borings SEB7+010E, SB7+050E and SEB7+140E at concentrations less than their respective General NPDES Permit discharge limits or MCLs.

Pesticides and PCBs

Analytical results for pesticides and PCBs are presented in Table 4.3.1.b. 4,4-DDE was detected in sample SEB7+010E-W at 0.000086 mg/L. No other pesticides or PCBs were detected.

Volatile Organic Compounds

Analytical results for VOC analyses of groundwater samples are presented in Table 4.3.1.c. VOCs were detected in two of the borings on the District property. The following compounds were detected in sample SEB7+010E-W: 1,4-Dichlorobenzene (0.0025 mg/L), Ethylbenzene (0.0085 mg/L), Isopropylbenzene (0.00077 mg/L), Naphthalene (0.0027 mg/L), and total Xylenes (0.023 mg/L). VOCs detected in sample SB7+050E-W included: Benzene (0.00055 mg/L), 1,4-Dichlorobenzene (0.00077 mg/L), and Naphthalene (0.031 mg/L). The concentrations of ethylbenzene and xylenes in SEB7+010E-W and naphthalene in SB7+050E-W exceed General NPDES Permit discharge limits.

No VOCs were detected in groundwater in the two borings on Sainte Claire property.

Semi-Volatile Organic Compounds

Analytical results for SVOC analyses of groundwater samples are presented in Table 4.3.1.d. 2,4-Dimethylphenol was detected in sample SEB7+010E-W at 0.0055 mg/L, and Naphthalene (also reported with VOCs) was detected in sample SB7+050E-W at 0.030 mg/L. Both borings are located on District property. No other SVOCs were detected. The concentrations of SVOCs reported above exceed General NPDES Permit discharge limits.

No SVOCs were reported in groundwater on Sainte Claire property.

Petroleum Hydrocarbons

Analytical results for TPHg and TPHd analyses of groundwater samples are presented in Table 4.3.1.e. Of the two samples analyzed, one sample form the Sainte Claire property (SB7+193E-W) contained TPHd at 0.091 mg/L. The concentration of TPHd in SB7+193E-W exceeded the General NPDES Permit discharge limit. It should be noted that in other analyses in the area the laboratories reported that TPHd reported did not match the diesel standard.

4.3.1.3 Discussion

4.3.1.3.1 Extent of Soil Contamination

The analytical data indicated that metals concentrations did not exceed the respective TTLCs or STLCs in the vicinity of the District and St. Claire properties. Mercury exceeded ten times the STLC in 10 samples collected on these properties, but based on the soluble mercury data collected during this investigation from other parts of the river alignment, it appears that none of the mercury is soluble. Lead also slightly exceeded ten times its STLC at 2.5 feet below grade in boring SB7+050E (56 mg/kg). Based on our experience on other parts of the Guadalupe River alignment and on Caltrans guidance regarding testing for aerially deposited lead California Department of Transportation (Caltrans) (Caltrans, 1995) lead concentrations below 75 mg/kg generally will not exceed the STLC when subjected to the WET.

Pesticides were detected at concentrations less than or equal to 0.088 mg/kg, and below TTLCs. VOCs (acetone and methylene chloride) were detected on District property in three samples at concentrations less than or equal to 0.0055 mg/kg.

All SVOCs were detected at concentrations less than 0.15 mg/kg, below concentrations of concern. Except for phenol (on Sainte Claire property, SB7+140E), the SVOCs reported in the soil samples (District property, SB7+150E) were polyaromatic hydrocarbons (PAHs). These compounds are typically associated with waste oil and heavier petroleum hydrocarbons such as coal tar and asphalt. Phenol is a wood preserver and a cleaning agent.

Asbestos was reported in all borings except SB7+050E, SEB7+055E, SEB+-75E, and SB7+105E. The reported asbestos content was above detection limits but less than 1 % in 11 samples, and over 1 % (the TTLC) in one sample at a depth of 4 feet below grade in boring SB7+193E (Sainte Claire Property). The source of the asbestos is probably landfill activities that are known to have occurred in the property vicinity in the past. Due to the variable nature of landfill materials, asbestos may be encountered across the property.

4.3.1.3.2 Extent of Groundwater Contamination

Metals, although reported at relatively low concentrations, do not appear to have significantly impacted the property. The pesticide 4,4-DDE appears to be present in groundwater in the vicinity of boring SEB7+010E but also at low concentrations. Pesticides were not reported in other groundwater samples.

VOCs also were reported in groundwater samples collected from the District property. Five different VOCs were reported. The concentrations of ethylbenzene and zylene is SEB7+010E-W and naphthalene in SB7+050E-W exceed the General NPDES Permit discharge criteria. No VOCs were detected on Sainte Claire property.

SVOCs (2,4-dimethylphenol and naphthalene) appear to have impacted groundwater on District property. Concentrations of these SVOCs exceed General NPDES Permit discharge criteria in SEB7+010E-W and SB7+050E-W, respectively. No SVOCs were detected in Sainte Claire property.

TPHd was detected on Sainte Claire property (SB7+193E) at 0.091 mg/l. This concentration exceeds the General NPDES Permit discharge limits of 0.050 mg/l. However, it should not be noted that chromatograms for other TPHd analyses in the area did not match the diesel standard. This suggests that naturally occurring hydrocarbons may be present in groundwater in the diesel range. Consequently, the General NPDES Permit discharge levels may not be applicable. TPHg and TPHd were not tested for in groundwater from District property.

4.3.1.3.3 Impacts to Construction

Currently the District owns parcel APN 15-41-006 but does not anticipate acquisition of the Sainte Claire property. The District may, however, modify the inboard embankment as part of the Project on both properties. Based on the information obtained from this investigation, it appears that asbestos has impacted the soil (SB7+193E) underlying the Sainte Claire Property. If the levees are excavated in the vicinity SB7+193E, underlying soils may need to be excavated in a manner that prevents airborne asbestos and the soils will need to be appropriately handled and disposed of as an asbestos containing waste.

In addition, groundwater underlying the District property contains VOCs, and SVOCs exceeding General NPDES Permit discharge limits. TPHd concentrations in boring SB7+193E (Sainte Claire property) exceeds General NPDES Permit discharge limits. If the District excavates to groundwater and dewatering is necessary, the water removed may require treatment prior to discharge.

4.3.1.4 Feasibility Study Results

As the District does not plan to acquire a portion of the Sainte Claire Property for the project no feasibility study was performed. In the future if the District decides to acquire the property a feasibility study should be considered as a result of the presence of asbestos in soil.

Groundwater is impacted to the extent that it cannot be discharged to the river during dewatering due to VOCs and SVOCs on District property. TPHd was reported in excess of General NPDES Permit discharge limits on Sainte Claire property. However, it is uncertain whether the TPHd reported is actually diesel or other organic compounds, possibly naturally occurring. Feasibility study information for groundwater underlying the Embankment Area is contained in Section 4.2.

4.3.1.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that asbestos is present on the Sainte Claire property in excess of hazardous waste criteria. Metals, pesticides, VOCs (District property only), and TPHd were present in soil from both properties at low concentrations.

VOCs and SVOC were reported in groundwater in excess of General NPDES Permit discharge limits on the District property. TPHd in excess of General NPDES Permit discharge limits was reported in groundwater from the Sainte Claire property.

4.3.1.6 Recommendations

As the Sainte Claire property will not be acquired, Kleinfelder recommends no further soil assessment at this site. However, if the District decides to acquire a portion of this property in the future the extent of asbestos in soil should be delineated to reduce the volume of soils needing special handling and disposal. If dewatering is necessary as part of construction, on District property or the adjacent to Sainte Claire property it may need to be treated prior to discharge. Any planned excavation or dewatering of both properties should be carried out following guidance in a Soil and Management Plan to be prepared by Kleinfelder.

If the District plans to excavate adjacent to Sainte Claire property and assessment related to identifying whether the TPHd present in groundwater is diesel or naturally occurring compounds should be carried out. This assessment will determine whether the General NPDES Permit discharge limitation for TPHd is applicable. Further, the District should consider excavation soils in the area in summer or fall months to potentially reduce the amount of groundwater that may need to be extracted, treated and discharged.

4.3.2 Station No. 7+040W to 7+110W – Levee Adjacent to Felton-Norborn (APN 15-34-063)

The Felton-Norborn property is located adjacent to the west bank of the Guadalupe River at 2100 Gold Street in Alviso (Plate 4.3.2). The District initially planned to acquire a 15-feet portion of the property. In later year 2000, the refined project design alterations excluded the proposed acquisition of the portion of the property. The embankments adjacent to this property may be modified, however the levee area has been addressed with embankment area in Section 4.2.1 of the report.

4.3.2.1 Work Performed

The Felton-Norborn property was identified as a property of concern during the Level I Investigation (District, 1996) due to its past use as a landfill. A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. The Felton-Norborn property was being used for storage of soil being excavated from a nearby construction property. Because the property owner denied access to the property, Kleinfelder drilled two soil borings, SB7+047W and SEB7+098W, on the levee adjacent to the property on August 17 and 31, 1999. The borings were completed at a depth of 26 feet below TOL. Boring SB7+047W was initially drilled using direct push method on August 17, 1999. Because refuse was encountered during the installation it was not possible to collect sufficient soil samples to allow analysis. Therefore, a hollow stem auger drill rig was used to advance boring SEB7+098W and re-advance boring SB7+047W on August 31, 1999. The boring logs are included in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 1.4 to 1.5 m (4.5 to 5.0 feet) – VOCs, SVOCs, Title 22 metals, TPHg and TPHd and asbestos;
- 2.0 to 2.1 m (6.5 to 7.0 feet) - VOCs, SVOCs, pesticides, Title 22 metals, TPHg and TPHd and asbestos;
- 2.3 to 2.4 m (7.5 to 8.0 feet) - VOCs, SVOCs, pesticides (boring SEB7+098W), Title 22 metals, TPHg and TPHd and asbestos;

- 2.7 to 2.9 m (9.0 to 9.5 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg and TPHd and asbestos;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – VOCs, SVOCs, pesticides (boring SB7+047W), Title 22 metals, TPHg and TPHd and asbestos;
- 5.9 to 6.1 m (19.5 to 20.0 feet; boring SB7+047W) - VOCs, SVOCs, Title 22 metals, TPHg and TPHd and asbestos;
- 6.4 to 6.6 m (21.0 to 21.5 feet; boring SEB7+098W) - VOCs, SVOCs, Title 22 metals, TPHg and TPHd and asbestos; and
- 7.5 to 7.6 m (24.5 to 25.0 feet) – VOCs, SVOCs, Title 22 metals, TPHg and TPHd and asbestos (boring SEB7+098W).
- Soil encountered in the borings consisted of clay. Refuse, including wood, plastic and a fibrous material, was encountered beginning at approximately 14 feet bgs in all three borings. Due to poor sample recovery, boring SB7+047W was re-drilled approximately two feet from the original boring.

A groundwater sample also was collected from each boring and submitted for analysis of VOCs, SVOCs, TPHg and TPHd. Groundwater samples for Title 22 metals and pesticide analyses also were collected and placed on hold pending soil analytical results.

4.3.2.2 Analytical Results

The following sections summarize the results of analyses of soil and groundwater samples collected from the levee adjacent to the Felton-Norborn property. The boring logs are presented in Appendix A. The analytical results are presented in Tables 4.3.2.a to 4.3.2.e.

4.3.2.2.1 Soil

Metals

Analytical results for 17 soil samples are presented in Table 4.3.2.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding

STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property. Chromium, lead, and mercury were detected in some samples at concentrations that exceeded ten times the respective STLCs. Arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc were detected in all 17 soil samples. Beryllium, cadmium, molybdenum, selenium, and silver were also detected in one or more samples.

Arsenic was detected in all samples, with concentrations ranging from 2.5 to 13 mg/kg. Barium, cobalt, and copper were detected in all samples with concentrations ranging from 79 to 210 mg/kg, 3.7 to 13 mg/kg, and 20 to 97 mg/kg, respectively. Beryllium was detected in seven samples from 0.51 to 0.67 mg/kg, and cadmium was detected in one sample at 2.7 mg/kg.

Chromium was detected in all samples, ranging from 30 to 72 mg/kg. Lead was detected in all samples, ranging from 6.3 to 220 mg/kg. Lead concentrations exceeded ten times the STLC in two samples: SB07+047W-9.5 at 220 mg/kg and SB07+047W-14.5 at 100 mg/kg. Mercury was detected in all samples, ranging from 0.063 to 3.1 mg/kg. Mercury concentrations exceeded ten times the STLC in two samples: SB07+047W-1.5 at 3 mg/kg, and SB07+047W-9.5 at 3.1 mg/kg. The analytical laboratory was requested to perform a soluble analysis for lead in the soil sample collected at a depth of 9.5 feet bgs in boring SB7+047W. This sample was selected because it had the highest concentration of lead reported at the property. The soluble lead analysis was requested for deionized water extract (to simulate the natural river environment). No soluble lead was reported above the laboratory reporting limit.

Molybdenum was detected in two samples at 3.3 mg/kg and 5 mg/kg, selenium was detected in four samples ranging from 2.4 to 2.5 mg/kg, and silver was detected in one sample at 1.3 mg/kg. All samples contained detections of nickel (24 to 83 mg/kg), vanadium (41 to 48 mg/kg), and zinc (49 to 780 mg/kg).

Pesticides and PCBs

Analytical results for eight soil samples are presented in Table 4.3.2.b. Eight soil samples were analyzed for pesticides and three soil samples were analyzed for PCBs.

4,4-DDD was detected in five samples ranging from 0.0027 to 0.011 mg/kg, and 4,4-DDE was detected in six samples ranging from 0.0035 mg/kg to 0.044 mg/kg. 4,4-DDT was detected in one sample at 0.016 mg/kg. Dieldrin was detected in sample SB07+047W-2.5 (0.0021 mg/kg), and heptachlor epoxide was detected in sample SEB07+098W-9 (0.0021 mg/kg). No other pesticides were detected.

Volatile Organic Compounds

Analytical results for 16 soil samples are presented in Table 4.3.2.c. 1,4-Dichlorobenzene was detected in sample SB07+047W-14.5 at 0.0065 mg/kg. No other VOCs were detected.

Semi-Volatile Organic Compounds

Analytical results for 17 soil samples are presented in Table 4.3.2.d. Phenol, a wood preservative and cleaner, was detected in soil samples from boring SB7+047W (0.21 mg/kg at 1.5 feet, 0.11 mg/kg at 2.5 feet, and 0.14 mg/kg at 9.5 feet). Bis(2-ethylhexyl)phthalate was detected in sample SEB07+098W-6.5 at 19 mg/kg. The reporting detection limit (63 mg/kg) for pentachlorophenol in sample SEB07+098W-14 was much higher than the TTLC (17 mg/kg). However, pentachlorophenol was not detected in any other samples from the property. No other SVOCs were reported.

Petroleum Hydrocarbons

Analytical results for 17 soil samples are presented in Table 4.3.2.d. TPHd was detected in samples from boring SB7+047W (6.8 mg/kg at 2.5 feet, 6.9 mg/kg at 6.5 feet, 35 mg/kg at 9 feet, 1.1 mg/kg at 9.5 feet, 580 mg/kg at 14.5 feet, and 18.0 mg/kg at 19.5 feet). TPHd also was detected in boring SEB7+098W (310 at 14 feet and 30 mg/kg at 21.0 feet). TPHg was not detected in any soil samples.

4.3.2.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs. The following sections summarize the results of analyses of the two groundwater samples. Complete analytical results are presented in Tables 4.3.2.a to 4.3.2.e.

Metals

Analytical results for two groundwater samples are presented in Table 4.3.2.a. Barium, chromium, cobalt, molybdenum, nickel, and zinc were detected at concentrations that are less than their respective MCLs NPDES groundwater discharge limits or MCLs.

Pesticides

Analytical results for one groundwater sample are presented in Table 4.3.2.b. Pesticides were not detected in groundwater.

Volatile Organic Compounds

Analytical results for two groundwater samples are presented in Table 4.3.2.c. Six VOCs were detected: benzene, chlorobenzene, 1,4-dichlorobenzene, isopropylbenzene, naphthalene, and total xylenes. The chlorobenzene, 1, 4 dichlorobenzene and napthalene results listed above exceed the NDES discharge limit of 0.005 mg/L for VOCs.

Five VOCs were detected in the sample from boring SB7+047W: Benzene (0.00096 mg/L), chlorobenzene (0.042 mg/L), 1,4-dichlorobenzene (0.047 mg/L), naphthalene (0.0057 mg/L), and isopropylbenzene (0.00063 mg/L). Chlorobenzene (0.018 mg/L), 1,4 dichlorobenzene (0.009 mg/L), and total xylenes (0.0049 mg/L) were detected in the groundwater sample from boring SEB7+098W. The chlorobenzene, 1,4-dichlorobenzene and naphthalene results listed above exceed the General NPDES Permit discharge limit of 0.005 mg/L for VOCs.

Semi-Volatile Organic Compounds

Analytical results for two groundwater samples are presented in Table 4.3.2.d. Four SVOCs were detected: Acenaphthene, bis(2-ethylhexyl)phthalate, 1,4-dichlorobenzene, and 4-methylphenol.

Two SVOCs were detected in the sample from boring SB7+047W: Acenaphthene (0.012 mg/L) and 1,4-Dichlorobenzene (0.0180 mg/L). Two SVOCs were also detected in the groundwater sample from boring SEB7+098W: bis(2-Ethylhexyl)phthalate (0.006 mg/L) and 4-methylphenol (0.0180 mg/L). The concentrations of 1,4-dichlorobenzene, bis(2-ethylhexyl)phthlate, and 4 methylphenol exceeded the NPDES discharge limit of 0.005 mg/L.

Petroleum Hydrocarbons

Analytical results for two groundwater samples are presented in Table 4.3.2.e. TPHd was detected in the groundwater samples from borings SB7+047W (2.80 mg/L) and SEB7+098W (2.40 mg/L). TPHg was reported in groundwater samples from SB7+047W (0.330 mg/L) and SEB7+098W (0.300 mg/L). The THPd and TPHg results exceeded the NPDES discharge limits (TPH of 0.050 mg/L).

4.3.2.3 Discussion

4.3.2.3.1 Extent of Soil Contamination

The analytical data for metals indicates that concentrations do not exceed the respective TTLCs in the borings drilled on the Felton-Norborn Property. Two lead and two mercury detections also exceeded ten times STLCs. The soil sample collected at a depth of 9.5 feet from boring SB07+047W was analyzed for soluble lead. Results of the analysis revealed no reportable concentrations of soluble lead. Based on the soluble mercury data from samples in other parts of the river alignment, it appears that none of the mercury is soluble.

The pesticides were reported in samples from the property but none of the concentrations were above the TTLC or the STLC. Due to the probable past use of the property for agriculture, it is likely that pesticides may be encountered sporadically across the property.

VOCs and SVOCs were reported in soil samples from boring SB7+047W. 1,4-dichlorobenzene, phenol, and bis(2-ethylhexyl)phthalate were detected in soil. The concentrations detected are below listed regulatory limits for these compounds.

TPHd was detected in samples collected from the two borings drilled on the property at concentrations ranging from 1.1 mg/kg at 9.5 feet to 580 mg/kg at 14.5 feet in boring SB7+047W. There are no regulatory limits for TPHd in soil, but there are concentrations for individual components (for example, benzene) which have listed regulatory limits. These individual components were not detected in the soil samples.

4.3.2.3.2 Extent of Groundwater Contamination

Metals were detected below regulatory limits. Pesticides were not detected above laboratory reporting limits in the samples collected from the property. VOCs and SVOCs were reported in the groundwater samples from boring SB7+047W and SEB7+098W at concentrations in excess of NPDES discharge limits.

TPHd and TPHg were detected in the groundwater samples collected from boring SB7+047W and SEB7+098W ranging from 2.4 to 2.8 mg/L and 0.3 to 0.33 mg/L, respectively. The TPHg and TPHd results exceeded NPDES discharge limits.

4.3.2.3.3 Impacts to Construction

Currently the District does not anticipate acquisition of this property, but may modify adjacent levee the inboard embankment as part of the Project. Based on the information obtained from this investigation, it appears that metals, pesticides, VOCs, SVOCs, (SEB7+098W) and petroleum hydrocarbons occur in the soil underlying the Felton-Norborn Property at concentrations below the regulatory threshold limits. Groundwater beneath the property has been impacted by VOCs, SVOCs and TPH in excess of NPDES limits. If the embankment is to be excavated, it is likely that soil above the water table will not require special handling and disposal. If soils are excavated below the water table and dewatering is necessary, soils will need to be separated and tested to determine appropriate disposal options. Also, groundwater, if encountered, may need to be treated prior to discharge under a NPDES permit.

4.3.2.4 Feasibility Study Results

A discussion of the feasibility of soil and groundwater management is contained in the section with embankment soils (Section 4.2.4).

4.3.2.5 Conclusions

Based on the data obtained during this property investigation, it appears that VOCs , SVOCs and TPH in groundwater above NPDES discharge limits exist beneath the property and may extend beneath the levee.

4.3.2.6 Recommendations

Since property acquisition may no longer be necessary, Kleinfelder recommends that no further investigation should be conducted on the property. If the District decides to acquire the property in the future, additional investigation may be necessary. The owner should be provided with the analytic data for the property.

4.3.3 Station No. 7+140W to 7+200W State of California Property at Gold Street (APN 15-34-019)

The State of California property is located adjacent to the Sommerset Mobile Home Park on Gold Street on the west bank of the Guadalupe River (Plate 4.3.3). The District may or may not acquire a portion of the property for the project construction.

4.3.3.1 Work Performed

The State of California property was identified as a property of concern during the Level I Investigation (District, 1996) due to its past use as a landfill. A reconnaissance was performed on September 28, 1999. The property is a vacant lot that has been ploughed. Kleinfelder advanced one soil boring, SEB7+155W, at the toe of the levee on September 30, 1999. The boring was completed at a depth of 20.5 feet bgs. A direct-push drill rig was used to advance the boring. Soil encountered in both borings consisted primarily of clay. The clay was gravelly from the surface to a depth of approximately 4 feet bgs. A sewage odor was noted at a depth of 11 feet below grade. The boring log is presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.5 to 0.6 m (1.5 to 2.0 feet) – Pesticides, Title 22 metals and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Pesticides, Title 22 metals and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals and asbestos;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Hold; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and asbestos.

A groundwater sample also was collected from the boring and submitted for analysis of VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses also was collected from SEB7+155W and placed on hold pending soil analytical results.

4.3.3.2 Analytical Results

The following summarizes the results of analyses of four soil samples and one groundwater sample collected from boring SEB07+155W on the State of California property. The boring log is presented in Appendix A. The analytical results are presented in Tables 4.3.3.a to 4.3.3.d.

4.3.3.2.1 Soil

Metals

Analytical results for four soil samples are presented in Table 4.3.3.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by WET to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property. Chromium and lead were detected in one sample each at levels that exceeded ten times STLC. Barium, chromium, cobalt, copper, mercury, nickel, vanadium, and zinc were detected in all four samples.

Chromium was detected in all samples, at concentrations ranging from 36 to 60 mg/kg. Lead was detected from samples collected at depths of 1.5, 4.5, and 9.5 from boring SEB7+155W, ranging from 11 to 110 mg/kg. Sample collected from 4.5 bgs was the only sample containing lead at concentration above ten times the STLC. No metals were reported above the TTLC. The Waste Extraction Test (WET) was not performed on the samples from this site where metal concentrations exceeded ten times the STLC. Wet analysis performed on samples containing lead concentrations over 100 mg/kg elsewhere did not contain soluble lead concentrations above the STLC.

Pesticides

Analytical results for three soil samples collected from SEB07+155W (depths of 1.5, 2.5, and 4.5 feet) are presented in Table 4.3.3.b. None of the samples contained pesticides above the TTLC or ten times the STLC. Three pesticides were detected at levels below STLC in the sample collected from 2.5 feet: 4,4-DDD (0.0156 mg/kg), 4,4-DDE (0.0413 mg/kg), and 4,4-DDT (0.014 mg/kg). Four compounds were detected in sample SEB07+155W-4.5 collected from a depth of 4.5 feet: Chlordane (0.248 mg/kg), dieldrin (0.0088 mg/kg), 4,4-DDD (0.0805 mg/kg), and 4,4-DDE (0.0264 mg/kg).

4.3.3.2.2 Groundwater

Groundwater was encountered at a depth of approximately 16 feet below grade during drilling. The following sections summarize results for sample SEB07+155W-W.

Pesticides

Analytical results are presented in Table 4.3.3.b. No pesticides were detected.

Volatile Organic Compounds

Analytical results are presented in Table 4.3.3.c. No VOCs were detected.

Semi-Volatile Organic Compounds

Analytical results are presented in Table 4.3.3.d. 2,4,6-Trichlorophenol was detected at 0.11 mg/L. The concentrations of 2, 4, 6 thrichlorophenol exceeded the NPDES discharge limit for SVOCs of 0.005 mg/L.

4.3.3.3 Discussion

4.3.3.3.1 Extent of Soil Contamination

The analytical data indicates that metals were not present in concentrations that exceed the respective TTLCs in the boring that was drilled on the State of California property. Lead exceeded ten times its STLC in one sample. However, based on work performed elsewhere it is unlikely that the sample would contain soluble lead above its STLC.

Pesticides (4,4-DDE, 4,4-DDD and 4,4-DDT) were detected below the TTLC and ten times its STLC, consequently the soil is not considered hazardous.

4.3.3.3.2 Extent of Groundwater Contamination

No VOCs were detected above laboratory reporting limits in groundwater collected from the boring placed on the State of California property. One SVOC was detected: 2,4,6-trichlorophenol in sample SEB07+155W-W at 0.01 mg/L. This result exceeded the NPDES discharge limit for SVOCs.

4.3.3.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides occur in soil underlying the State of California property at concentrations below the regulatory threshold limits. SVOCs in groundwater may be of concern if the District excavations below the embankment to groundwater and dewatering is required. In that case treatment of groundwater may be necessary prior to discharge.

4.3.3.4 Feasibility Study Results

Due to the apparent limited impacts to soil by pesticides and metals, Kleinfelder does not recommend a feasibility study for soil management at or adjacent to this property. Feasibility study information regarding impacted groundwater is discussed with the Embankment Area (Section 4.2).

4.3.3.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are no significant environmental impacts to the soil beneath the property. If the District acquires the property, soil to be generated will not be classified as a hazardous waste and would not require special handling in regard to disposal. However, if the District were to acquire the site and encounter groundwater, treatment of impacted groundwater would be necessary prior to discharge.

4.3.3.6 Recommendations

Whether or not the District acquires the property for project construction, Kleinfelder does not recommend any additional investigation for this property at this time. Groundwater if encountered during construction of the project, should be treated and discharged under NPDES permit.

4.3.4 Station No. 8+070W to 8+990W – City of Santa Clara (APN 97-01-038 and 039)

The City of Santa Clara property is located adjacent to the west bank of the Guadalupe River near Highway 237 (Plate 4.3.4). The District initially planned to acquire a 15 feet portion of the property. In late year 2000, the refined project design alterations excluded the proposed acquisition of the portion of the property but may modify the levee adjacent to this property for the construction of a flood protection project.

4.3.4.1 Work Performed

The City of Santa Clara property was identified as a property of concern during the Level I Investigation (District, 1996) due to its past use as a landfill (the All-Purpose Landfill). A property reconnaissance was performed on September 2, 1999. Three borings, SB8+123W, SB8+275W and SB8+370W, were drilled on parcel APN 97-01-038 and five borings, SB8+453W, SB8+490W, SB8+621W, SB8+758W and SB8+888W, were drilled on parcel APN 97-01-039. The borings were completed at a depth of 27 to 31.5 feet below grade. Borings SB8+123W, SB8+275W, SB8+370W and SB8+453W were advanced with a hollow stem auger drill rig because the property is located within an identified archeological area. The hollow stem auger rig was on the property on September 8 and 9, 1999. The other borings were advanced by direct-push methods on September 10 and 11, 1999. All borings were advanced approximately 50 feet away from the toe of the levee due to the presence of a drainage ditch and buried gas line. The boring logs are presented in Appendix A. Soils encountered from the surface to a depth ranging from approximately 3 to 12 feet primarily consisted of sandy clay. A layer of clay underlies this unit. A layer of silty to clayey sand was encountered at a depth of approximately 24 to 27 feet below grade in borings SB8+275W, SB8+370W,SB8+621W and SB8+888W.

Soil samples were collected and submitted for analysis as described below:

- 0.5 to 0.6 m (1.5 to 2.0 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg, TPHd and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – VOCs, SVOCs, pesticides, Title 22 metals, TPHg, TPHd and asbestos;

- 1.4 to 1.5 m (4.5 to 5.0 feet) – VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – VOCs, SVOCs, , Title 22 metals, TPHg, and TPHd.

Groundwater samples also were collected from each boring and submitted for analysis of VOCs, SVOCs, TPHg and TPHd. Groundwater samples for Title 22 metals and pesticide analyses also were collected and placed on hold pending soil analytical results from all borings except SB8+621W, which did not produce a sufficient volume of water.

4.3.4.2 Analytical Results

The following summarizes the results of analyses of 61 soil and 8 groundwater samples collected from the levee adjacent to the City of Santa Clara property.

4.3.4.2.1 Soil

Metals

Analytical results for 58 soil samples are presented in Table 4.3.4.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by WET to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property. Lead exceeded ten times its STLC in five samples, and mercury exceeded ten times its STLCs in six samples. Barium, chromium, cobalt, copper, lead, nickel, vanadium, and zinc were detected in all 58 soil samples at concentrations below TTLCs and ten times the STLC. Arsenic, beryllium, cadmium, and molybdenum were also detected in one or more samples at concentration below TTLC and ten times their STLC.

Arsenic was detected in 56 samples with conditions ranging from 1 to 40 mg/kg. Barium, cobalt, and copper were detected in all samples with concentrations ranging from 23 to 230 mg/kg, 3.3 to 16 mg/kg, and 9.9 to 36 mg/kg, respectively. Beryllium was detected in 25 samples from 0.5 to 0.65 mg/kg, and cadmium was detected in one sample at 0.55 mg/kg.

Molybdenum was detected in four samples with concentrations ranging from 1.1 to 1.6 mg/kg, and nickel was detected in all samples with concentrations ranging from 17 to 110 mg/kg. Vanadium and zinc were detected in all samples with concentrations ranging from 13 to 48 mg/kg and from 22 to 70 mg/kg, respectively.

Pesticides and PCBs

The analytical results for 24 soil samples are presented in Table 4.3.4.b. Pesticides were detected below TTLC and ten times their the respective STLCs in all samples. Dieldrin was detected in samples collected from boring SB8+621W (0.0022 mg/kg at 1.0 and 0.0021 mg/kg at 2.5 feet). Endrin was detected in sample SB8+370W-4.5 (0.0021 mg/kg). 4,4-DDT was detected in samples collected from borings SB8+123W (0.02 mg/kg at 2.5 feet), and SB8+453W (0.011 mg/kg at 1.5 feet). 4,4-DDE was detected in 20 samples, with concentrations ranging from 0.0021 to 0.068 mg/kg. 4,4-DDD was detected in 10 samples, ranging from 0.002 to 0.02 mg/kg. The sum of the combined concentrations for 4,4-DDT, 4,4-DDE, and 4,4-DDD range from 0.0021 to 0.068, below the TTLC and ten times the STLC and are below the STLC.

Volatile Organic Compounds

The analytical results for 61 soil samples are presented in Table 4.3.4.c. Acetone was detected in four of the 61 samples soil samples, at concentrations ranging from 0.056 to 0.140 mg/kg. No other VOCs were detected in any other sample.

Semi-Volatile Organic Compounds

The analytical results for 59 soil samples are presented in Table 4.3.4.d. Phenol was detected in 12 of the 59 soil samples, at concentrations ranging from 0.1 to 0.23 mg/kg. No other SVOCs were reported in any other samples.

Petroleum Hydrocarbons

Analytical results for 58 soil samples are presented in Table 4.3.4.e. TPHd was detected samples, at concentrations ranging from 1 to 33. The three highest concentrations were detected in samples SB08+123W-2.5 (140 mg/kg), SB08+275W-2.5 (140 mg/kg), and SB08+370W-1.5 (510 mg/kg). TPHg was not detected in any of the samples.

Asbestos

Twenty four samples were analyzed for asbestos. No asbestos was detected.

4.3.4.2.2 Groundwater

Groundwater was encountered at depths of 9 to 27 feet below grade.

Metals

Analytical results for seven groundwater samples are presented in Table 4.3.4.a. Barium, cadmium, chromium, cobalt, copper, molybdenum, selenium, silver, and zinc were detected at concentrations that are less than their respective MCLs or NPDES discharge limit criteria. One result for nickel from boring SB8+758W (0.097 mg/L) exceeded the calculated 100 gpm NPDES discharge limit for nickel (0.0734 mg/L) but was less than the 50 gpm limit (0.11 mg/L).

Pesticides and PCBs

Analytical results for seven groundwater samples are presented in Table 4.3.4.b. The only pesticide detected in all the seven groundwater samples was 4,4-DDE from boring SB8+888W at concentrations of 0.00013 mg/L. There are no MCL or NPDES discharge limits established for this pesticide.

Volatile Organic Compounds

Analytical results for eight groundwater samples are presented in Table 4.3.4.c. 1,1-dichloroethane (0.00065 mg/L) and 1,2-dichloroethane (0.0011 mg/L) were detected in the groundwater samples from borings SB8+758W and SB8+453W, respectively. The concentration of 1,2-Dichloroethane exceeded the NPDES discharge limit of 0.0005 mg/L.

Semi-Volatile Organic Compounds

Analytical results for eight groundwater samples are presented in Table 4.3.4.e. The only SVOC detected in groundwater was di-n-octylphthalate at a concentration of 0.005 mg/L in boring SB8+490W, the same concentrations as the NPDES discharge limit for SVOCs.

Petroleum Hydrocarbons

Analytical results for eight groundwater samples are presented in Table 4.3.4.e. TPHd was detected at concentrations of 0.14, 1.5 and 0.28 mg/L in three groundwater samples collected from borings SB8+621W, SB8+758W and SB8+888W, respectively. TPHD was not detected in any of the remaining five samples. TPHg was not detected in the groundwater samples. The TPHd results exceed the NPDES discharge criteria of 0.050 mg/L.

4.3.4.3 Discussion

4.3.4.3.1 Extent of Soil Contamination

The analytical data indicates that metal concentrations in samples from borings drilled on the City of Santa Clara Property did not exceed their respective TTLCs. Mercury exceeding ten times the STLC was detected in six samples collected from borings SB8+275W (3.8 mg/kg at 2.5 feet), SEB8+370W (2.2 and 2.3 mg/kg at 9.5 and 14.5 feet, respectively), SB8+453W (2.1 mg/kg at 14.0 feet), and SEB8+888W (8.2 and 6.4 mg/kg at 1.0 and 2.5 feet, respectively). Lead concentrations exceeded ten times its STLC in soil samples collected from borings SB8+275W (50.0 mg/kg at 2.5 feet), SB8+370W (56.0 and 92.0 mg/kg at 9.5 and 14.5 feet, respectively), and SB8+621W (64.0 mg/kg at 4.0 feet). Soluble metals analyses (Waste Extraction Tests [WET]) were not performed for soil samples from this property. However WETs performed elsewhere as part of this investigations on similar concentrations of lead and mercury indicate the presence of soluble lead and mercury below their STLC.

No pesticides were reported above the TTLC or the STLC limits. It is possible that pesticides were encountered sporadically across the property because the property was probably used for agricultural purposes in the past. However, the concentrations detected are not considered hazardous.

Acetone was reported in soil samples from three borings; SB8+370W (0.14 and 0.056 mg/kg at 9.5 and 14.5 feet, respectively), SB8+490W (0.072 mg/kg at 4.5 feet), and SB8+621W (0.072 mg/kg at 14.5 feet, respectively). Acetone is a common laboratory chemical. Since it was reported by itself and in low concentrations, it is possible that is the detected acetone was a laboratory contaminant.

TPHd was reported in all eight borings drilled on the property at concentrations ranging from 1.1 mg/kg at 9.5 feet in boring SB8+123W to 510.0 mg/kg at 1.5 feet in boring SB8+370W. There are no clear regulatory limits for TPHd in soil, but there are levels for individual components (for example, benzene) which were detected below the reporting limits.

Asbestos is not a concern for the properties since there was none detected in the 24 samples analyzed.

4.3.4.3.2 Extent of Groundwater Contamination

No pesticides or SVOCs were reported above the listed regulatory limits in the groundwater samples collected from the City of Santa Clara property. 1,2-DCA was reported above the NPDES discharge limit of 0.0005 mg/L at 0.0011 mg/L in boring SB8+453W. No other VOCs were reported. Di-n-octylphthlate was detected at the NPDES discharge limit of 0.005 mg/L in SB8 +490W. TPHd was detected in all eight borings. TPHd exceeded the NPDES discharge limits (0.050 mg/L) in borings SB8+621W, SB8+758W and SB8+888W.

4.3.4.3.3 Impacts to Construction

The District may not acquire portions of the properties. Inboard embankments on District property may be modified as part of the Project. Potential hazardous material impacts to the levees were investigated with embankment area. The hazardous material impacts on this properties are small and probably do not extend to the embankment soils anticipated for excavation. A discussion of potential groundwater impacts to construction is presented in the embankment Section 4.2.

4.3.4.4 Feasibility Study Results

Since as the District may not acquire the property, no feasibility study for soil management for this property will be completed. Groundwater feasibility information is presented in the Embankment Area Section 4.2.

4.3.4.5 Conclusions

Based on the data obtained during the property investigation, it appears that metals (nickel), VOCs, SVOCs and TPHd at concentrations exceeding their respective NPDES discharge limits exist in groundwater beneath the property. Also metals, pesticides and VOCs at low concentrations exist in soil at the property. No asbestos was found in the soil at the site. The presence of chemicals in soil will likely not impact the project construction. Chemicals in groundwater may impact the Project if project construction activities on the levee embankment encounters groundwater.

4.3.4.6 Recommendations

Kleinfelder recommends that no additional investigation of the properties should be performed. Groundwater, if encountered during construction at the adjacent levee, should be treated and discharged under an NPDES permit.

Also, metals pesticides and VOCs at low concentrations exist in soil at the property. No asbestos was found in the soil at the site.

4.3.5 Station No. 8+470E to 8+620E – Levee Adjacent to Beaumont Investments Ltd. (APN 97-02-036)

The Beaumont Investments Ltd. property is located adjacent to the east bank of the Guadalupe River between State Route 237 and Tasman Drive (Plate 4.3.7). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the refined project design alternatives excluded the proposed acquisition of the portion of the property. The embankments adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.3.5.1 Work Performed

The Beaumont Investments Ltd. property was identified as a property of concern during the Level I Investigation (District, 1996) due to the past use of surrounding properties for landfill/agricultural activities. A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. Because the property owner denied access to the property, Kleinfelder drilled two soil borings, SB8+505E and SB8+610E, on the levee adjacent to the property on August 18, 1999. The borings were completed at a depth of 30 feet below TOL. A hollow stem auger was used to advance the borings because the property is located within an identified archeological area.

Soil encountered in both borings consisted of clay. Thin sandy layers were encountered at 9 feet and 24 feet below TOL. At 19 feet below TOL, a layer of twigs and roots were encountered. The levee height was estimated (based on visual observation) to be approximately 20 feet along the property. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;

- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals and pesticides;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and pesticides;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals and pesticides; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals.

A groundwater sample also was collected from each boring and submitted for analysis of VOCs and SVOCs. Groundwater samples for Title 22 metals and pesticide analyses also were collected from SB8+505E and placed on hold pending soil analytical results. It was not possible to collect enough water for metals or pesticide analyses from SB8+610E due to slow recharge into the borehole.

4.3.5.2 Analytical Results

The following summarizes the results of analyses of 16 soil samples and two groundwater samples collected from the levee adjacent to the Beaumont Investments Ltd. property. The summarized results are presented in Tables 4.3.5.a to 4.3.5.d. The certified analytical reports are presented in Appendix B.

4.3.5.2.1 Soil

Metals

Analytical results for 16 soil samples are presented in table 4.3.5.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property. Lead and mercury were detected in some samples at concentrations that exceeded ten times the STLCs established for these metals. Arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc were detected in all 16 soil samples. Beryllium, molybdenum, chromium and selenium were also detected in one or more samples.

Arsenic was detected in one of the 16 samples at a concentration above ten times its STLC at 47 mg/kg. Arsenic was detected in the remaining 15 samples at concentrations less than ten times the STLC. Barium, cobalt, and copper were detected in all samples with concentrations ranging from 110 to 210 mg/kg, 9.2 to 16 mg/kg, and 18 to 59 mg/kg, respectively. Beryllium was detected in four samples from 0.51 to 0.55 mg/kg, and molybdenum was detected in one sample at 1 mg/kg.

Chromium was detected in all samples, ranging from 36 to 79 mg/kg. Lead was detected in all samples, ranging from 5.3 to 210 mg/kg. The highest concentration of lead (210 mg/kg) was detected in sample SB08+505E-19.5, and exceeded ten times the STLC. Mercury was detected in all samples, ranging from 0.11 to 9.3 mg/kg. Eight mercury concentrations exceeded ten times the STLC. The highest concentration of mercury (9.3 mg/kg) was detected in sample SB08+505E-19.5. Soluble lead and soluble mercury analyses were performed on this sample, but soluble mercury and lead were not detected above the reporting limits.

Selenium was detected in eight samples with concentrations ranging from 2 to 2.8 mg/kg. Nickel, vanadium and zinc were detected in all samples with concentrations ranging from 46 to 110 mg/kg, from 28 to 46 mg/kg, and from 41 to 100 mg/kg, respectively.

Pesticides and PCBs

Analytical results for six soil samples are presented in Table 4.3.5.b. Pesticides 4,4-DDD, 4,4-DDE and DDT were detected in all soil samples except for SB08+505E-19.5 at concentration below TTLC and ten times the STLC.

Asbestos

Asbestos was reported at concentrations less than 1 % (chrysotile and total) in boring SB8+505E 1.5, 2.5 and 4.5 feet below the top of the levee (TOL). No asbestos was reported in the three soil samples collected from the same depths in boring SB8+610E.

4.3.5.2.2 Groundwater

Groundwater results are presented in Tables 4.3.5.a to 4.3.5.d. A groundwater sample was collected from SB08+505E and analyzed for metals, pesticides and PCBs, VOCs, and SVOCs. A groundwater sample was also collected from SB08+610E and analyzed for VOCs and SVOCs. Five metals were detected (barium, cobalt, molybdenum, nickel, selenium, and vanadium) at concentrations that are below MCLs or NPDES discharge limits. Pesticides, VOCs, and SVOCs were not detected in groundwater.

4.3.5.3 Discussion

4.3.5.3.1 Extent of Soil Contamination

The analytical data for metals indicate that some lead, and mercury concentrations exceeded ten times the respective STLCs in the vicinity of the levee adjacent to Beaumont Investments Ltd. property. However, based on the soluble mercury and lead data from the soil sample collected from boring SB8+505E, the groundwater sample collected from the same boring, and other samples collected in this investigation from other parts of the river alignment, it appears that none of the mercury is soluble. The soil sample collected from boring SB8+505E at a depth of 19.5 contained no soluble lead.

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were reported just below their TTLC at 19.5 feet below TOL in boring SB8+505E. The concentrations of these compounds were less in the sample from SB8+610E. Asbestos was not reported above 1% in the samples analyzed from either boring.

4.3.5.3.2 Extent of Groundwater Contamination

No VOCs, or SVOCs were reported above laboratory reporting limits in the groundwater samples collected from borings SB08+505E and SB08+610E. No pesticides were reported above laboratory reporting limits in the sample collected from SB+505E. The five metals that were detected were reported at concentrations below MCLs and NPDES discharge criteria

4.3.5.3.3 Impacts to Construction

The District does not anticipate acquiring this property. Based on the information obtained from this investigation, impacts to the Project associated with this property are not anticipated.

4.3.5.4 Feasibility Study Results

Since the District will not acquire this property and no significant impacts to soil by pesticides, metals or asbestos were found, Kleinfelder does not recommend a feasibility study for soil management related to this property.

4.3.5.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are no significant environmental impacts to the Project construction.

4.3.5.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property at this time.

4.3.6 Station No. 9+260W to 10+290W – Sports and Open Space Authority of the City of Santa Clara (APN 97-05-102)

The Sports and Open Space Authority of the City of Santa Clara (Open Space) Property is located on the west bank of the Guadalupe River southeast of Tasman Drive and north of Lick Mill Boulevard (Plate 4.3.6). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the refined project design alternative excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified however the levee area has been addressed with the Embankment Area in Section 4.2.1 of the report.

4.3.6.1 Work Performed

The Sports and Open Space Authority of the City of Santa Clara Property was identified as a property of concern during the Level I Investigation (District, 1996). The work was performed to assess the possible past use of the property for agriculture. A property reconnaissance was performed on September 2, 1999. The property was currently vacant, but had been occupied by a golf course in the past. Kleinfelder drilled six soil borings, SB9+252W, SEB9+318W, SB9+750W, SEB9+910W, SB10+100W and SEB10+220W, at the toe of the levee on September 2, 7 and 8, 1999. The borings were completed at depths of 25.5 to 37.5 bgs. A hollow stem auger drill rig was used to advance the borings because the property is located within an identified archeological area. The boring logs are presented in Appendix A.

Soil samples were generally collected and submitted for analysis as described below:

- 0.5 to 0.6 m (1.5 to 2.0 feet) – Title 22 metals, pesticides and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals, pesticides and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, pesticides and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals;

- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals.

Soil samples from boring SEB9+910W were collected at depths of 8.5, 9.5, 11.5, 16.5, 21.5, 26.5, 31.5, and 36 feet bgs, and analyzed for the same parameters. A sample was also collected at a depth of 4.5 feet bgs and placed on hold. This boring was sampled differently due to its location on a small ridge (estimated to be approximately 8.5 feet above the toe of the levee) approximately 10 feet away from the toe of the levee. A ditch along the toe of the levee prevented access to the toe.

A groundwater sample also was collected from each boring, except boring SB9+252W, and submitted for analysis of VOCs and SVOCs. Boring SB9+252W did not produce sufficient groundwater to allow sampling. Groundwater samples were also collected for Title 22 metals and pesticide analyses and placed on hold pending soil analytical results. However, the laboratory inadvertently analyzed the groundwater samples placed on hold.

4.3.6.2 Analytical Results

The following summarizes the results of analyses of 44 soil and 5 groundwater samples collected from the Sports and Open Space Authority of the City of Santa Clara property. The certified analytical reports are presented in Appendix B. The analytical results are summarized in Tables 4.3.6.a to 4.3.6.e.

4.3.6.2.1 Soil

Metals

Analytical results for 44 soil samples are presented in Table 4.3.6.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property.

Arsenic was detected in one of the 44 soil samples at a concentration exceeding ten times the STLC of 93 mg/kg in a sample SEB9+318W-2.5. Arsenic was detected in 37 soil samples at concentrations ranging from 1.3 to 20 mg/kg. Arsenic was not detected in the remaining seven samples. Barium, cobalt, and copper were detected in all samples with concentrations ranging from 35 to 170 mg/kg, 3.6 to 16 mg/kg, and 11 to 62 mg/kg, respectively. Beryllium was detected in 15 samples from 0.5 to 0.79 mg/kg, and molybdenum was detected in five samples from 1.1 to 5.9 mg/kg.

Chromium was detected in all samples, ranging from 19 to 68 mg/kg. Lead was detected in 40 soil samples, at concentrations ranging from 3.4 to 17 mg/kg. Lead was detected in the remaining four samples at concentrations exceeding ten times as STLC, ranging from 34 to 250 mg/kg. The highest two concentrations of lead (250 mg/kg in sample SEB09+318W-2.5 and 78 mg/kg in sample SB09+252W-9). Mercury was detected in all but one sample, ranging from 0.051 to 11 mg/kg. Ten mercury concentrations exceeded ten times the STLC. The highest concentration of mercury (11 mg/kg) was detected in sample SB10+100W-1.5. Soluble metal analyses (Waste Extraction Test [WETs]) were not performed for soil samples from this property.

Nickel, vanadium and zinc were detected in all samples with concentrations ranging from 18 to 120 mg/kg, from 18 to 47 mg/kg, and from 27 to 76 mg/kg, respectively.

Pesticides and PCBs

Analytical results for 18 soil samples are presented in Table 4.3.6.b. The sum of concentrations of pesticides DDD, DDE, and DDT were detected in two samples at concentrations exceeding both the TTLC and ten times the STLC, of 1.0 mg/kg. Pesticides DDD, DDE, and DDT were not detected in seven samples and was detected below TTLC and STLC in nine remaining samples.

Heptachlor was detected in three samples, at concentrations ranging from 0.0031 to 0.004 mg/kg. These concentrations are below the TTLC and STLC for heptachlor. Other pesticides constituents were not detected in all other samples.

Asbestos

Analytical results for 12 soil samples are presented in Table 4.3.6.e. Asbestos was not detected in any of the samples analyzed.

4.3.6.2.2 Groundwater

Barium, cobalt, molybdenum, and nickel were detected in the five groundwater samples analyzed at concentrations below NPDES discharge limits (Table 4.3.6.a). Pesticides and PCBs were not detected above reporting limits (Table 4.3.6.b) in any of the five samples. Naphthalene and xylenes were detected in sample SB10+100W-W at concentrations of 0.0036 mg/L and 0.0023 mg/L, respectively. No other VOCs or SVOCs were detected in the five groundwater samples.

4.3.6.3 Discussion

4.3.6.3.1 Extent of Soil Contamination

The analytical data for metals indicates that concentrations detected in soil samples did not exceed the respective TTLCs in the borings drilled on the Sports and Open Space Authority of the City of Santa Clara Property. Mercury exceeding ten times its STLC was detected in samples collected from borings SB9+252W, SEB9+318W, SB9+750W, SB10+100W, and SEB10+220W. The soil sample collected at a depth of 2.5 feet in boring SEB9+318W exceeded ten times the STLC for lead and arsenic. Based on the soluble mercury data collected during the investigation from other parts of the river alignment, it is believed that none of the mercury is soluble. Out of 46 WETs performed elsewhere in this investigation for lead at similar concentrations, soluble lead was detected in 24 of the samples and 3 of the tests produced soluble lead in concentrations in excess of the STLC.

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were reported with a total concentration above the TTLC at 2.5 and 1.5 feet in borings SEB9+318W (1.37 mg/kg) and SB10+100W (1.01 mg/kg), respectively. The combined concentration of these compounds was less than the TTLC in other samples collected from the property. The probable past use of the property for agriculture makes it likely that pesticides may be encountered sporadically across the property.

4.3.6.3.2 Extent of Groundwater Contamination

No pesticides were reported in the groundwater samples collected from the Sports and Open Space Authority of the City of Santa Clara Property. The SVOCs and VOCs, naphthalene and total xylenes (VOCs) were reported in one groundwater sample collected from one boring (SB10+100W) at 0.0036 and 0.0023 mg/L, respectively, below the NPDES discharge limits. VOCs were not detected in groundwater samples collected in other borings.

4.3.6.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides have impacted the soil at two locations (SEB9+318W and SB10+100W) at the Sports and Open Space Authority of the City of Santa Clara Property; however, the impacts are probably sporadic. Since the District may not acquire this property, no significant impacts are expected with respect to the project construction. The levee area adjacent to the property has been addressed with other embankment areas.

4.3.6.4 Feasibility Study Results

Since the District may not acquire this property, a feasibility study is not necessary for the site.

4.3.6.5 Conclusions

Since the District may not acquire the property, it is Kleinfelder's opinion that the pesticides found on the property may not impact project construction.

4.3.6.6 Recommendations

As the District will not acquire the property, no further investigation on the property by the District is indicated.

4.3.7 Station No. 10+700E to 11+000E - City of San Jose (APN 97-06-037)

The City of San Jose property is a vacant lot located adjacent to the east bank of the Guadalupe River between Tasman Drive and Montague Expressway (Plate 4.3.7). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the refined project design alternative excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified however the levee area has been addressed with the Embankment Area in Section 4.2.1 of the report.

4.3.7.1 Work Performed

The City of San Jose property was identified as a property of concern during the Level I Investigation (District, 1996) due the past and present use for agricultural activities. A property reconnaissance was performed on September 9, 1999. Kleinfelder advanced three soil borings, SB10+725E, SB10+800E and SB10+950E, at the outboard toe of the levee on September 16, 1999. The borings were completed at a depth of 24 (refusal in boring SB10+725E) to 30 feet bgs. A direct push rig was used to advance the borings. Soil encountered in upper 15 to 18 feet consisted primarily of clay. Silty and clayey sand layers were encountered below clay. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals and pesticides;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and pesticides;
- 1.3 to 1.4 m (4.0 to 4.5 feet) – Title 22 metals and pesticides;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals.

Groundwater samples for Title 22 metals and pesticide analyses also were collected and placed on hold pending soil analytical results.

4.3.7.2 Analytical Results

The following summarizes the results of analyses of 22 soil and three groundwater samples collected from the City of San Jose property. The analytical results are presented in Tables 4.3.7.a and 4.3.7.b, and are summarized in the following sections.

4.3.7.2.1 Soil

Metals

Analytical results for 22 soil samples are presented in Table 4.3.7.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples from this property. Lead, mercury, and nickel were detected in some samples at concentrations that exceeded ten times the STLCs established for these metals. Arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium, and zinc were detected in all soil samples. Beryllium and molybdenum were detected in one or more samples.

Arsenic was detected in all of the soil samples, at concentrations ranging from 1 to 24 mg/kg. Barium, cobalt, and copper were detected in all samples at concentrations ranging from 20 to 150 mg/kg, 2.3 to 24 mg/kg, and 8.3 to 42 mg/kg, respectively, below TTLC and ten times its STLC. Beryllium was detected in five samples from 0.5 to 0.55 mg/kg, and molybdenum was detected in one sample at 1 mg/kg.

Chromium was detected in all samples below the TTLC and ten times its STLC, ranging from 12 to 230 mg/kg. Lead was detected in all samples, ranging from 2 to 76 mg/kg. Only three of the

22 samples analyzed exceeded ten times its STLC. The highest lead concentration (76 mg/kg), detected in sample SB10+950E-4, exceeded ten times the STLC. Mercury was detected in all samples except for two samples at concentrations, ranging from 0.074 to 15 mg/kg. Six of the 22 samples analyzed contained mercury concentrations exceeding ten times the STLC. Nickel was detected in one of the 22 samples at 380 mg/kg, exceeding ten times its STLC. Soluble metals analyses were performed for mercury in boring SB10+800E at 2.5 feet and in boring SB10+950E for nickel at 1.0 foot. Both analyses reported no soluble concentrations. Vanadium and zinc were detected in all samples with concentrations ranging from 11 to 38 mg/kg and from 19 to 81 mg/kg, respectively.

Pesticides and PCBs

Analytical results for nine soil samples are presented in Table 4.3.7.b. Dieldrin (at concentrations ranging from 0.0021 to 0.12 mg/kg), 4,4-DDT (0.11 to 0.36 mg/kg), 4,4-DDE (0.0021 to 0.45 mg/kg) and 4,4-DDD (0.003 to 0.24 mg/kg) were the only pesticides reported in the soil samples. The sum total concentrations of 4,4-DDT, 4,4-DDD and 4,4-DDE did not exceed the STLC and TTLC in any of the samples. PCBs were not analyzed in any of the samples.

4.3.7.2.2 Groundwater

Analytical results for three groundwater samples are presented in Tables 4.3.7.a and 4.3.7.b. Thallium, reported at a concentration of 0.01 mg/L in the groundwater sample from boring SB10+725E-W, exceeded its MCL (0.002 mg/L). Barium (0.072 and 0.11 mg/L), molybdenum (0.033 and 0.032 mg/L) and zinc (0.012 and 0.01 mg/L) were detected in the groundwater samples from borings SB10+800E and SB10+950E, respectively. Nickel (0.0069 mg/L) also was reported in the groundwater sample from SB10+950E. Except for the reported concentration of thallium described above, all reported concentrations were below their MCLs, where established. Pesticides were not detected in any of the groundwater samples.

4.3.7.3 Discussion

4.3.7.3.1 Extent of Soil Contamination

Mercury, lead, and mercury were detected at concentrations exceeding ten times the STLC in some of the samples. However, additional analyses for soluble lead and mercury performed elsewhere during the investigation show that these metals are not soluble. Other metals reportedly present in soil were below the TTLC and ten times the STLC.

4.3.7.3.2 Extent of Groundwater Contamination

One metal (Thallium) was reported above its MCL in boring SB10+800E-W. No other metals were reported above the MCL or NPDES discharge limits. No pesticides were reported in any groundwater samples collected from the property.

4.3.7.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides occur in the soil underlying City of San Jose Property at concentrations below the regulatory threshold limits. Thallium was detected in groundwater above its MCL; however, it is not anticipated that groundwater will be encountered during excavation for channel modifications. Since the District may not acquire property, and no significant chemical impacts in soil were recognized, conditions on this property should not impact the project construction.

4.3.7.4 Feasibility Study Results

Since the District may not acquire the property and due to the apparent limited chemical impacts to soil and groundwater, a feasibility study is not recommended

4.3.7.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there will likely be no significant environmental impacts to the Project construction. The soil underneath is not classified as a hazardous waste and does not require special handling in regard to disposal. Groundwater will likely not be encountered during the construction of the adjacent embankment.

4.3.7.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property at this time.

4.3.8 Station No. 10+500W to 10+930W – State of California (APN 97-08-045)

The State of California property is a vacant lot located adjacent to the west bank of the Guadalupe River between Tasman Drive and Montague Expressway and north of Lick Mill Boulevard (Plate 4.3.8). Initially the District planned to acquire the property. In late year 200, the refined project design alternative excluded the proposed acquisition of the property. The property has been sold to a commercial developer therefore the District will not acquire the property.

4.3.8.1 Work Performed

The State of California property was identified as a property of concern during the Level I Investigation (District, 1996) due to its past use for agricultural activities. A reconnaissance was performed on October 1, 1999. The property is presently a vacant lot that has been ploughed. Kleinfelder drilled three soil borings, SB10+560W, SB10+754W, and SB10+864W at the toe of the levee on October 1, 1999. The borings were completed at depths of 20.5, 19.0 and 27.0 feet bgs, respectively. A direct-push drill rig was used to advance these three borings. Kleinfelder drilled a boring to the depth of 5 ft bgs on October 4, 2000, to confirm the VOCs found in groundwater.

Soil encountered in the borings consisted primarily of clay in the first 9 feet in each boring. Boring SB10+560W encountered silty sand, which continued to the bottom of the boring. Boring SB10+754W encountered interbedded clay, sand and silt to the depth of boring. SB10+864W was clay to 15 feet bgs where increasing sand zones were encountered to the bottom of the boring. Groundwater was encountered between 9 and 14 feet in SB10+560W to SB10+864W, respectively. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.5 to 0.6 m (1.5 to 2.0 feet) – Pesticides, Title 22 metals, SVOCs and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Pesticides (and asbestos in samples SB10+560W and EB10+864W);

- 1.4 to 1.5 m (4.5 to 5.0 feet) – Pesticides, Title 22 metals, SVOCs and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals and asbestos;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – SVOCs;

- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and VOCs (sample SB10+560W); and
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals and SVOCs (in sample SB10+754W).

Additionally, soil samples (at 1.5, 4.5, and 14.5 feet) were collected from boring SB10+864W and analyzed for VOCs.

A groundwater sample was also collected from the borings and submitted for analysis of VOCs and SVOCs. Additional groundwater sample for Title 22 metals and pesticide analyses were collected from the borings and placed on hold pending soil analytical results.

4.3.8.2 Analytical Results

The following summarizes the results of analyses of 19 soil and 3 groundwater samples collected from the State of California property. The analytical results are presented in Tables 4.3.8.a to 4.3.8.d, and are summarized as follows:

4.3.8.2.1 Soil

Metals

Analytical results for 13 soil samples are presented in Table 4.3.8.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples.

Arsenic was detected in two samples at concentrations of 7 mg/kg and 38 mg/kg, below ten times the STLC. Barium, cobalt, and copper were detected in all samples below their TTLC and ten times their STLC with concentrations ranging from 31 to 190 mg/kg, 6.2 to 20 mg/kg, and 9 to 46 mg/kg, respectively. Beryllium was detected in one sample at 0.62 mg/kg.

Chromium was detected in all samples below TTLC and ten times its STLC, ranging from 20 to 130 mg/kg. Lead was detected in five samples, ranging from 6.2 to 110 mg/kg. The highest lead concentration (110 mg/kg), detected in sample SB10+560W-1.5, exceeded ten times the STLC. Soluble analyses performed on the same sample detected a soluble lead concentration of 1.32 mg/L, which is below the STLC. Mercury was detected in all samples, ranging from 0.0737 to 15 mg/kg. Only three of the 14 mercury concentrations exceeded ten times the STLC.

Nickel, vanadium, and zinc were detected in all samples with concentrations ranging from 20 to 160 mg/kg, 21 to 59 mg/kg, and from 26 to 98 mg/kg, respectively.

Pesticides

Analytical results for nine soil samples are presented in Table 4.3.8.b. 4,4-DDD was reported in boring SB10+560W (0.102 mg/kg at 1.5 feet) and in boring SB10+754W (0.0294 mg/kg at 1.0 feet). 4,4-DDE was reported in boring SB10+560W (0.223 mg/kg at 1.5 feet, and 0.498 mg/kg at 2.5 feet), and in boring SB10+754W (0.0202 mg/kg at 1.0 foot). 4,4-DDT was reported in boring SB10+560W (0.217 mg/kg at 1.5 feet, and 0.324 at 2.5 feet mg/kg) and in boring SB10+754 (0.0402 mg/kg at 1.0 foot). The combined concentrations of 4,4-DDT and its breakdown products were detected below their TTLC of 1.0 mg/kg. No other pesticide was reported in the samples analyzed.

Volatile Organic Compounds

No VOCs were detected in any of the four soil samples analyzed for VOCs.

Semi-Volatile Organic Compounds

No SVOCs were detected in any of the ten samples analyzed for SVOCs.

4.3.8.2.2 Groundwater

Groundwater was encountered at a depth of between 9 and 14 feet bgs during drilling.

Metals

Analytical results for three groundwater samples are presented in Table 4.3.8.a. Metals detected in groundwater samples collected from borings SB10+560W, SB10+754W, and SB10+864W respectively, include: barium (1.9, 0.59 and 1.5 mg/L), chromium (0.29, 0.084 and 0.22 mg/L), cobalt (0.15 mg/L, not-detected [ND], and 0.065 mg/L), copper (0.22, 0.063 and 0.16 mg/L), lead (0.12 mg/L, ND and ND), mercury (0.00143 mg/L, 0.0003 mg/L and ND), nickel (0.47, 0.12 and 0.23 mg/L), vanadium (0.22, 0.081 and 0.16 mg/L), and zinc (0.37, 0.15 and 0.35 mg/L). Copper and nickel were detected in all three samples at concentrations that exceed NPDES discharge limits. Mercury at 0.00143 mg/L and zinc at 0.37 mg/L exceed NPDES discharge limits. All metals concentrations were below MCLs except barium in SB10+560W and SB10+864W; chromium in SB10+560W; and nickel in SB10+560W, SB10+754W and SB10+864W.

Pesticides

Analytical results for three groundwater samples are presented in Table 4.3.8.b. 4,4-DDE was detected in the groundwater sample from boring SB10+560W at a concentration of 0.00114 mg/L. Heptachlor was detected above the MCL of 0.00001 mg/L in the samples collected from SB10+754W-W (0.000033 mg/L) and SB10+864W-W (0.000026 mg/L).

Volatile Organic Compounds

Analytical results for three groundwater samples are presented in Table 4.3.8.c. Tetrachloroethene (0.0159 mg/L), Trichloroethene (0.0087 mg/L) and cis-1,2-Dichloroethene (0.0102 mg/L) were detected in the groundwater sample from boring SB10+864W at concentrations that exceeded the General NPDES Permit discharge limit for VOCs of 0.005 mg/L. No other VOCs were reported in groundwater samples from the property.

Semi-Volatile Organic Compounds

Analytical results for three groundwater samples are presented in Table 4.3.8.d.

Phenol, a wood preservative and a cleaner, was reported in the groundwater sample from boring SB+754W (0.0065 mg/L), as well as bis(2-ethylhexyl)phthalate (0.0337 mg/L) and 2-Nitrophenol (0.0059 mg/L). These SVOCs exceed the General NPDES Permit discharge limit for SVOCs of 0.005 mg/L. No other SVOCs were reported in samples collected from the property.

4.3.8.3 Discussion

4.3.8.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the borings drilled on the State of California Property. Mercury exceeding ten times its STLC was reported in the sample collected at approximately 1.0 to 1.5 feet bgs in borings SB10+560W (15 mg/kg), SB10+754W (14.4 mg/kg), and SB10+864W (2.97 mg/kg). Lead was also reported at 10 times the STLC in boring SB10+560W at 1.5 feet (110 mg/kg). However, based on the soluble mercury and lead data collected in this investigation from other parts of the river alignment, it appears that none of the mercury or lead is not significantly soluble.

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were detected with a total concentration below the TTLC (1.0 mg/kg) at 1.5 feet below ground surface (0.542 mg/kg), and 2.5 feet (0.822 mg/kg) in boring SB10+560W and at 1.0 feet (0.0898 mg/kg) in boring SB10+754W. Because the property was probably used for agricultural purposes in the past, pesticides may be encountered sporadically across the property.

4.3.8.3.2 Extent of Groundwater Contamination

Groundwater containing copper, nickel, mercury and zinc in concentrations exceeding General NPDES Permit discharge limits was found in all three boreholes.

Heptachlor was detected above the MCL of 0.00001 mg/L in the samples collected from SB10+754W-W (0.000033 mg/L) and SB10+864W-W (0.000026 mg/L).

Tetrachloroethene (0.0159 mg/L), Trichloroethene (0.0087 mg/L) and cis-1,2-Dichloroethene (0.0102 mg/L) were reported in the groundwater sample from boring SB10+864W. These values are above the General NPDES Permit discharge limits for these compounds. No other constituents were reported above these limits.

4.3.8.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that VOCs and SVOCs have impacted the groundwater underlying the State of California Property at concentrations above the regulatory threshold limits stated above. Remedial investigation data for the adjoining Lick Mill property suggest that affected groundwater flows under the levee. As indicated in current plans for channel modification vertical excavations will be limited to approximately 1 m (3 feet). Consequently, groundwater may not be exposed as groundwater was encountered in this investigation at 9 to 14 feet bgs. If dewatering was to become necessary during construction, the water to be removed may need to be treated and discharged under an appropriate NPDES Permit.

4.3.8.4 Feasibility Study Results

Due to the presence of VOC-affected groundwater at shallow depth extending over a wide area (see Plate 4.3.8), a feasibility study is appropriate. Feasibility information is provided in the Embankment Section (Section 4.3.2) of this report.

4.3.8.5 Conclusions

Based on the data obtained during this property investigation, it appears that VOCs above the General NPDES permit discharge limit exist in groundwater beneath the property. The levee area to be modified during construction has been addressed with embankment area in Section 4.2.4 of the report.

4.3.8.6 Recommendations

Kleinfelder recommends additional sampling of groundwater at the levee or verifying the depth to groundwater if the levee area will be excavated. The groundwater table likely fluctuates seasonally. The district may consider performing construction in the summer or fall to avoid or minimize dewatering. If it is determined that dewatering will be necessary during construction, the groundwater may need to be treated to meet the General NPDES Permit discharge limits prior to discharge into the river.

4.3.9 Station No. 10+890W to 11+240W – Levee Adjacent to Lick Mill Creek Apartments (APN 97-08-028, 035 and 036)

The Lick Mill Creek Apartments (Lick Mill) property is located adjacent to the west bank of the Guadalupe River between Tasman Drive and Montague Expressway and north of Lick Mill Boulevard (Plate 4.3.9). The District may modify the levee adjacent to this property for the construction of a flood protection project.

4.3.9.1 Work Performed

The Lick Mill property was identified as a property of concern during the Level I Investigation (District, 1996) due to remediation of VOCs ongoing on the property. A reconnaissance visit of the site was performed between May 3 to 5, 1999. Because the property owner denied access to the property, Kleinfelder drilled three soil borings, SB10+935W, SB10+980W and SEB11+005W, on the levee adjacent to the property on August 19 and 20, 1999. An additional boring, SB10+864W was completed at the toe of the levee on the adjacent property (State of California) on October 1, 1999. Borings SB10+935W, SB10+980W and SEB11+005W were completed at a depth of 30.5 feet below TOL. Boring SB10+864W was completed at a depth of 20 feet bgs. A hollow stem auger drill rig was used to advance the borings because the property is located within an identified archeological area.

Soil encountered consisted primarily of clay. Silty sands and gravels were encountered at 14 to 19 feet below TOL in borings SB10+980W and SEB11+005W. The levee height was estimated (based on visual observation) to be approximately 20 feet along the property. The boring logs are presented in Appendix A.

Soil Samples were collected and submitted for analysis as described below:

- 0.3 to 0.4 m (1.0 to 1.5 feet) – VOCs and Title 22 metals;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – VOCs and Title 22 metals;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – VOCs and Title 22 metals;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – VOCs and Title 22 metals;

- 4.4 to 4.6 m (14.5 to 15.0 feet) – VOCs, Title 22 metals and pesticides;
- 5.9 to 6.1 m (19.5 to 20.0 feet) – VOCs, Title 22 metals and pesticides;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – VOCs, Title 22 metals and pesticides; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – VOCs and Title 22 metals.

A groundwater sample also was collected from each of the three boring and submitted for analysis of VOCs. In addition, groundwater samples for Title 22 metals and pesticide analysis were collected and placed on hold.

On October 2, 2000, Kleinfelder drilled an additional soil boring on the levee adjacent to the Lick Mill property for an additional groundwater sample. However, groundwater was not encountered at 5ft below the levee toe. SEB11+080W was completed on October 2, 2000 by hand auger to a depth of 5 feet bgs. No groundwater was encountered in the borehole. Finally, a soil boring was attempted at SEB11+080W but was not completed due to refusal. The boring logs are presented in Appendix A. A soil sample was collected at 5 feet bgs from SEB11+080W and submitted for analysis.

1.4 to 1.5 m (4.5 to 5.0 feet) - Title 22 Metals, VOCs and SVOCs.

4.3.9.2 Analytical Results

The following summarizes the results of analyses of 25 soil and 3 groundwater samples collected from the levee adjacent to the Lick Mill property. The certified analytical reports are presented in Appendix B. The analytical results are presented in Tables 4.3.9.a to 4.3.9.d, and are summarized in the following sections:

4.3.9.2.1 Soil

Metals

Analytical results for 25 soil samples are presented in Table 4.3.9.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding

STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples. Chromium and mercury were detected in samples at concentrations that exceeded ten times the STLCs. Arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc were detected in all samples. Beryllium and selenium were also detected in one or more samples.

Arsenic and barium were detected in all samples at concentrations ranging from 1.9 to 13 mg/kg and 23 to 140 mg/kg, respectively, below their TTLC and ten times their STLC. Beryllium was detected in one sample at 0.5 mg/kg. Cobalt and copper were also detected in all samples with concentrations ranging from 6.3 to 14 mg/kg and 11 to 53 mg/kg, respectively.

Chromium was detected below its TTLC and ten times its STLC in all samples, ranging from 27 to 80 mg/kg. Mercury was detected in all samples, ranging from 0.065 to 7.7 mg/kg. Thirteen of the 25 mercury concentrations exceeded ten times the STLC. The samples with mercury exceeding ten times the STLC were collected from borings SB10+935W, SEB10+980W, and SEB11+005W.

Lead and nickel were detected in all samples with concentrations ranging from 1.7 to 30 mg/kg and 39 to 110 mg/kg, respectively. Selenium was detected in all but one sample from 2.7 to 5.3 mg/kg. Vanadium and zinc were detected in all samples with concentrations ranging from 17 to 80 mg/kg and 26 to 59, respectively.

Pesticides

Analytical results for nine soil samples are presented in Table 4.3.9.b. 4,4-DDE was detected in samples collected from boring SEB10+980W at concentrations of 0.051 mg/kg at 14.5 feet bgs, and 0.0056 mg/kg at 19.5 feet bgs. 4,4-DDD was detected in the SEB 10+980W samples at 0.058 mg/kg at 14.5 feet bgs, and 0.015 mg/kg at 19.5 feet bgs. The combined concentrations of DDD, DDE and 4,4-DDT were detected below the TTLC of 1.0 mg/kg. No other pesticides were detected.

Volatile Organic Compounds

Analytical results for 25 soil samples are presented in Table 4.3.9.c. The only VOC reported in soil sample was acetone in boring SB10+935W at concentration of 0.056 mg/kg at 24.5 feet bgs.

Semi-Volatile Organic Compounds

One sample, SEB11+080W-5, was analyzed for SVOCs. No SVOCs were detected.

4.3.9.2.2 Groundwater

Groundwater was encountered at a depth of approximately 19 feet below TOL in each of the borings. The chemical analyses are summarized as follows:

Metals

Arsenic, was detected in groundwater at concentrations of 0.015 mg/L in SEB10+980W and 0.022 mg/L in SEB11+005W, above General NPDES Permit discharge limits. Cobalt, molybdenum, nickel, vanadium, and zinc were detected in groundwater samples at concentrations below the discharge limits.

Pesticides and PCBs

No pesticides were detected in groundwater samples analyzed.

Volatile Organic Compounds

Analytical results for three samples are presented in Table 4.3.9.c. No VOCs were detected above reporting limits for sample SB10+935W-W. 1,1-dichloroethane (0.0021mg/L), cis-1,2dichloroethene (0.0043 mg/L), trans-1,2-dichloroethene (0.00077 mg/L), and vinyl chloride (0.0027 mg/L) were detected in sample SEB10+980W. Carbon disulfide (0.0076 mg/L), 1,1-dichloroethane (0.0025 mg/L), cis-1,2-dichloroethene (0.046 mg/L), toluene (0.00055mg/L), and vinyl choride (0.0370 mg/L) were detected in sample SEB11+005W-W. The cis-1,2-dichloroethene and carbon disulfide concentrations detected in sample SEB11+005W-W, and vinyl chloride concentrations detected in SEB10+980W and SEB11+005W exceeded the General NPDES Permit discharge limits.

4.3.9.3 Discussion

4.3.9.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the borings drilled on the levee adjacent to the Lick Mill property or on the adjacent State of California property. Mercury exceeding ten times its STLC was reported in 13 soil samples. Based on the soluble mercury and lead data collected in this investigation from other parts of the river alignment, it appears that the mercury or lead is not soluble at the concentrations detected.

Pesticides were reported at low concentrations in boring SEB10+980W. The concentrations did not exceed their TTLCs. Because the property was probably used for agricultural purposes in the past, pesticides may be encountered sporadically across the property.

Acetone was detected at 0.056 mg/kg in boring SB10+935W. This VOC may be associated with VOCs known to exist at the Lick Mill site or due to laboratory contamination. Acetone is a commonly used cleaning agent in analytical laboratories.

4.3.9.3.2 Extent of Groundwater Contamination

Vinyl chloride (reported at concentrations of 0.0027 and 0.037 mg/L in borings SEB10+980W and SEB11+005W, respectively) exceeded the General NPDES Permit discharge limit. The General NPDES Permit discharge limit for cis-1,2-dichloroethene and carbon disulfide also were exceeded in the groundwater sample from boring SEB11+005W (0.046 mg/L). No other constituents were reported above these limits. There is an ongoing VOC and paraldehyde in groundwater extraction and treatment on the Lick Mill Property. According to the historical data collected from the property, the groundwater flow direction is north-northeast from SEB11+00W toward the area and the State of California property. The eastern extent along the levee is uncertain. Plate 4.3.9 illustrates the approximate extent of VOCs in the groundwater.

4.3.9.3.3 Impacts to Construction

Based on the information obtained from this investigation, and the historic data contained in the "Quarterly Status Report for May 1 through July 31, 1999, Mansion Grove Apartments, Santa Clara, California" prepared by Levine Fricke dated August 30, 1999 and subsequent reports prepared by Montgomery Watson, it appears that VOCs may have impacted the groundwater underlying the levee adjacent to the Lick Mill Apartments property at concentrations above the General NPDES Permit discharge limits. If excavation to the groundwater depth is necessary during construction, the water to be removed may require treatment prior to discharge.

4.3.9.4 Feasibility Study Results

Due to the potential impacts to groundwater by VOCs, a feasibility study for groundwater management for the levee excavation adjacent to this property may be necessary. Feasibility information for the levee area is provided in the Embankment Section (Section 4.3.2) of this report.

4.3.9.5 Conclusions

Based on the data obtained during the investigation and the past investigations conducted by others, it appears that VOCs above the General NPDES Permit discharge limits in groundwater exist beneath the property and adjacent levee. The levee area that may be modified during construction has been addressed with the Embankment Area in Section 4.2.1 of this report.

4.3.9.6 Recommendations

Kleinfelder recommends additional investigation of groundwater at the levee, if the levee area will be excavated to groundwater depths. The groundwater table likely fluctuates seasonally. The District may consider performing construction in summer and fall months to avoid or minimize dewatering.

If it is determined that dewatering will be necessary, a groundwater treatment system will need to be designed and installed as required under an appropriate discharge permit.

4.3.10 Station No. 10+824E to 11+240E – Levee Area Adjacent to Wyse Investments Technology (APN 97-06-039)

The Wyse Investments Technology (Wyse) property is located adjacent to the east bank of the Guadalupe River between Tasman Drive and Montague Expressway (Plate 4.3.10). Initially the District planned to acquire a 20 foot portion of the property for project construction. In late year 2000 the refined design alternative excluded the property acquisition. However, the levee area may be modified and the levee area has been addressed with the embankment area in Section 4.2.1.

4.3.10.1 Work Performed

The Wyse property was not identified as a property of concern during the Level I Investigation (District, 1996). The property was investigated due to the proposed acquisition of portion of the property. A property reconnaissance was performed on September 6, 1999. During the reconnaissance, no issues of concern were noted because the property was occupied by what appeared to be office buildings with no outside activities. Kleinfelder advanced two soil borings, SB11+060E and SB11+153E, at the toe of the levee on September 17, 1999. The borings were completed at a depth of 5 feet bgs. A hand auger was used to advance the borings.

Soil encountered in both borings consisted of clay from the surface to approximately 3 feet below grade. Silty sand underlies the clay. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.3 to 0.4 m (1.5 to 2.0 feet) – Title 22 metals and pesticides;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and pesticides; and
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals and pesticides;

Groundwater samples were not collected from either boring.

4.3.10.2 Analytical Results

The following summarizes the results of metals and pesticide analyses of six soil samples collected from the Wyse property. The analytical results are presented in Tables 4.3.10.a and 4.3.10.b and are summarized as follows.

Metals

Analytical results for six soil samples are presented in Table 4.3.10.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples.

Barium was detected in all samples with concentrations ranging from 76 to 120 mg/kg. Cobalt and copper were also detected in all samples with concentrations ranging from 8.7 to 13 mg/kg and 19 to 50 mg/kg, respectively. Chromium was detected in all samples, ranging from 39 to 65 mg/kg.

Lead was detected above ten times the STLC in samples SB11+060E-1.5 (99 mg/kg) and SB11+153E-1.5 (100 mg/kg). Mercury was detected in all samples, ranging from 0.88 to 16 mg/kg. Mercury was detected above ten times the STLC in samples collected from borings SB11+060E (11 mg/kg at 1.5 feet and 12 mg/kg at 2.5 feet) and SB11+153E (16 mg/kg at 1.5 feet, 15 mg/kg at 2.5 feet, and 13 mg/kg at 4.5 feet). Soil samples collected from depths of 1.5 and 4.5 feet in boring SB11+153E were submitted for analysis for soluble mercury. The 1.5-foot samples was also analyzed for soluble lead. Soluble mercury and lead were below the reporting limit.

Nickel and vanadium were detected in all samples with concentrations ranging from 64 to 130 mg/kg and 24 to 33 mg/kg, respectively. Zinc was detected in all samples with concentrations ranging from 41 to 67 mg/kg.

Pesticides

Analytical results for six soil samples are presented in Table 4.3.10.b. The TTLC for the combined concentrations of pesticides 4,4-DDT, 4,4-DDE and 4,4-DDD (1 mg/kg) was exceeded in sample SB11+153E-1.5 (2.52 mg/kg). The combined concentration of the same three pesticides exceeded the TTLC in sample at concentrations of SB11+060E-1.5 (0.81 mg/kg). Other reported concentrations of pesticides detected in the remaining four samples were found less than their respective TTLCs and STLCs.

4.3.10.3 Discussion

4.3.10.3.1 Extent of Soil Contamination

Lead, and mercury were detected above ten times the STLC in two soil (less than 5 feet) samples collected from the property. Based on the solubility analysis, the mercury and lead do not appear to be soluble. Also, based on work performed elsewhere, chromium may also not be soluble. Other metals reportedly present in soil were not reported above regulatory thresholds.

Soil in the vicinity of boring SB11+153E appears to have been impacted by the pesticides 4,4-DDT, 4,4-DDE and 4,4-DDD (cumulative concentration of 2.52 mg/kg). These pesticides were reported at concentrations exceeding the TTLC, which would define them as a hazardous waste in the event of excavation. Because of the uneven use of pesticides across agricultural properties, high levels of pesticides could be present in other locations on the Wyse property.

4.3.10.3.2 Impacts to Construction

If the outboard toe was to be excavated, the soils should be sampled, analyzed and disposed of appropriately. However, the District does not anticipate acquiring the property for the Flood Control Project. Consequently, Wyse property conditions will likely have limited impact on the Project.

4.3.10.4 Feasibility Study Results

As the District does not plan to acquire the property no feasibility study is recommended for the Wyse property. A feasibility study was performed for the associated Embankment Area in Section 4.2.

4.3.10.5 Conclusions

Based on the data obtained during this property investigation, there may be environmental impacts (pesticides) on the Wyse property.

4.3.10.6 Recommendations

Kleinfelder recommends no additional investigation, as the property will not be acquired.

4.3.11 Station No. 11+650W to 11+807W – State of California (APN 97-08-023)

The State of California property is located adjacent to the west bank of the Guadalupe River on the north side of Montague Expressway (Plate 4.3.11). Initially the District planned to acquire a 25 foot portion of the properly for project construction. In late year 2000 the refined design alternative excluded the proposed acquisition. However the levee area may be modified and the levee area has been addressed with the embankment area in Section 4.2.1.

4.3.11.1 Work Performed

The State of California property was identified as a property of concern during the Level I Investigation (District, 1996) due to past use of the property for agricultural activities. A reconnaissance was performed on September 28, 1999. The property is a vacant lot. Kleinfelder drilled two soil borings, SB11+654W and SEB11+730W, at the toe of the levee on October 1, 1999. The borings were completed at a depth of approximately 21 feet below grade. A direct push drill rig was used to advance the borings.

Soil encountered from the surface to a depth of approximately 12 feet bgs in both borings consisted of clay or sandy clay. Silty and clayey sands underlay the clays. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.4 to 0.5 m (1.5 to 2.0 feet) – Title 22 metals, pesticides and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Pesticides and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, pesticides and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals; and
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Hold.

A groundwater sample also was collected from boring SEB11+730W and placed on hold pending soil analytical results.

4.3.11.2 Analytical Results

The following sections summarize the results of metals and pesticide analyses of eight soil samples and one groundwater sample collected from the State of California property. The analytical results are presented in Tables 4.3.11.a and 4.3.11.b.

4.3.11.2.1 Soil

Metals

Analytical results for eight soil samples are presented in Table 4.3.11.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in any soil samples.

Arsenic and barium were detected in all samples with concentrations ranging from 12 to 20 mg/kg and 61 to 150 mg/kg, respectively. Cobalt and copper were also detected in all samples with concentrations ranging from 7 to 15 mg/kg and 17 to 33 mg/kg, respectively.

Chromium was detected in all samples, ranging from 26 to 71 mg/kg, and mercury was detected in all samples, ranging from 0.114 to 8.13 mg/kg. Mercury concentrations exceeded ten times the STLC in samples collected from 1 to 9.5 feet deep in borings SB11+654W and SEB11+730W. Soil samples collected from depths of 4.5 and 9.5 feet in boring SB11+654W were submitted for analysis for soluble mercury. Soluble mercury was detected at concentrations below the STLC for both samples.

Lead was detected in six samples, ranging from 26 to 41 mg/kg, and nickel was detected in all samples, ranging from 32 to 110 mg/kg. Vanadium and zinc were detected in all samples with concentrations ranging from 27 to 43 mg/kg and 40 to 84 mg/kg, respectively.

Pesticides

Analytical results for six soil samples are presented in Table 4.3.11.b. 4,4-DDD was reported in boring SEB11+654W (0.0176 mg/kg at 4.5 feet). 4,4-DDE was reported in borings SEB11+654W (0.00907 mg/kg at 1.5 feet, 0.0026 mg/kg at 2.5 feet, and 0.0163 mg/kg at 4.5 feet); and SEB11+730W (0.0056 mg/kg at 1.5 feet, 0.00632 mg/kg at 2.5 feet, and 0.0363 mg/kg at 4.5 feet). 4,4-DDT was reported in borings SEB11+654W (0.0126 mg/kg at 1.5 feet, and 0.0137 mg/kg at 4.5 feet); and SEB11+730W (0.00725 mg/kg at 1.5 feet, and 0.0375 mg/kg at 4.5 feet). The combined concentrations are below the TTLCs and STLCs for pesticides 4,4-DDD, 4,4-DDE, and 4,4-DDT. No other pesticides were detected.

4.3.11.2.2 Groundwater

Groundwater was encountered at 10 feet bgs in boring SB11+654W and 16 feet bgs in boring SEB11+730W. One groundwater sample was collected from boring SEB11+730W. Barium (2.0 mg/L), chromium (0.17 mg/L), and nickel (0.17 mg/L) were detected above the MCL values. Copper (0.099 mg/L), and zinc (0.25 mg/L) were detected at concentrations below MCLs. Nickel and copper were detected at concentrations above General NPDES Permit discharge limits given the 50 to 100 gpm discharge assumption. Vandium (0.12 mg/L) was also detected. Pesticides were not detected above reporting limits.

4.3.11.3 Discussion

4.3.11.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the borings drilled on the State of California property. Mercury were detected above ten times the STLCs in samples collected from borings SEB11+654W and SEB11+730W. Based on the soluble mercury data from 101 samples collected during this investigation from other parts of the river alignment, it appears that very little of the mercury in the area is soluble.

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were reported with combined concentrations below the TTLC (1.0 mg/kg) in samples collected from borings SEB11+654W and SB11+730W.

It is likely that pesticides and metals may be encountered sporadically across the property since the property was probably used for agricultural purposes in the past.

4.3.11.3.2 Extent of Groundwater Contamination

Nickel and copper were detected in the sample collected from boring SEB11+730W at concentrations of 0.17 mg/L, and 0.099 mg/L, respectively, above the General NPDES Permit discharge limits. Barium and chromium were also detected above MCL concentrations for these compounds. No pesticides were detected in the groundwater sample collected from boring SEB11+730W on the State of California property.

4.3.11.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that metals (nickel and copper) have impacted the groundwater underlying the State of California property at concentrations above General NPDES Permit discharge limits. However, given that groundwater was encountered at 10 foot depth, impacts, if any, to construction are anticipated to be small.

4.3.11.4 Feasibility Study Results

Inasmuch as the District does not intent to purchase this property, no feasibility study is deemed necessary for the property.

4.3.11.5 Conclusions

Based on the data obtained during this property investigation, groundwater is impacted by nickel and copper above the General NPDES Permit limits on the property. As groundwater was found to be present at 10 to 16 feet bgs, the need for dewatering will be small. Consequently, no impacts to the Project are anticipated.

4.3.11.6 Recommendations

Kleinfelder recommends no additional assessment at this site.

4.3.12 Station No. 12+690W to 13+300W – Levee Adjacent to MacPhee/Barbieri (APN 97-31-0013 and 014 and 97-40-050, 051 and 054)

The MacPhee/Barbieri property is located adjacent to the west bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.3.12). The property is occupied by Viking Freight. The District has never considered the acquisition of a portion of the property but may modify the levee adjacent to Viking properties, and may remove sediment in the river channel.

4.3.12.1 Work Performed

The MacPhee/Barbieri property was identified as a property of concern during the Level I Investigation (District, 1996) due to the past remedial actions on the property. A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. Kleinfelder drilled one soil boring, SEB12+715W, on the levee adjacent to the property on August 30, 1999 to investigate the impact of contamination on Viking properties to the levee area. The boring was completed at a depth of 30 feet below TOL. A hollow stem auger drill rig was used to advance the boring. Three (3) additional proposed borings were not drilled at the request of the District.

A groundwater sample was collected from boring SEB12+715W on August 30, 1999, and submitted for analysis of pesticides, VOCs, SVOCs, TPHg and TPHd. The boring log is presented in Appendix A.

On October 2, 2000, Kleinfelder advanced four additional soil borings at the inboard toe of the levee adjacent to MacPhee/Barbieri. Borings SEB12+900W and SEB13+150W were drilled by hand auger to a depth of 5 feet bgs on the inboard embankment. Borings SEB12+690W and SEB12+765W were drilled to 13 feet bgs on the inboard bore in an attempt to collect groundwater samples. No groundwater was obtained and consequently, a 1.5 m (5 ft) depth soil sample was collected instead. A groundwater sample was collected on August 30, 1999 at soil boring SEB12+900W and analyzed for lead, VOCs and TPHd. Soil samples were collected and submitted for analysis as described below:

- SEB12+690W-1.4 to 1.5 m(4.5 to 5.0 feet)-lead, VOCs, and TPHd;

- SEB12+765W-1.4 to 1.5 m(4.5 to 5.0 feet)-lead, VOCs, and TPHd; and
- SEB13+150W-4 to 1.5 m(4.5 to 5.0 feet)-lead, mercury, VOCs, and TPHd.

Soil encountered in the boring consisted of layers of sandy to silty clay and sands. The boring log is presented in Appendix A.

4.3.12.2 Analytical Results

The following sections summarize the results of metals and pesticide analyses of three soil samples and two groundwater samples collected from the levee adjacent to the MacPhee/Barbieri property. The analytical results are presented in Tables 4.3.12.a to 4.3.12.e.

4.3.12.2.1 Soil

Metals

Detections of lead and mercury were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered a hazardous waste). TTLCs were not exceeded in any soil samples.

Lead was detected below TTLC in samples SEB12+690W-5 (at a concentration of 45 mg/kg), SEB12+765W-5 (at a concentration of 44 mg/kg), and SEB13+150W-5 (at a concentration of 51 mg/kg). Mercury was detected in sample SEB13+150W-5 (at a concentration of 7 mg/kg). The lead and mercury concentrations detected in sample SEB13+150W-5 exceeded ten times their STLCs.

Soluble metal analyses Waste Extraction Test (WETs) were not performed for soil samples from this property because only one sample exceeded ten times its STLC limits.

Volatile Organic Compounds

VOCs were not detected above the reporting limits in the three soil samples.

Petroleum Hydrocarbons

Analytical results for three soil samples are presented in Table 4.3.12.e. TPHd was detected in samples SEB12+690W-5 (4.1 mg/kg), SEB12+765W-5 (3.3 mg/kg), and SEB13+150W-5 (8.1 mg/kg). The two higher concentrations were reported by the analytical laboratory that the hydrocarbon detected did not match the typical diesel pattern. TPHg was not detected above the reporting limit in any of the samples.

4.3.12.2.2 Groundwater

Groundwater samples were collected from borings SEB12+715W and SEB12+900W. The depth to groundwater appears variable near the toe of the levee as two borings were drilled to 13 feet bgs and groundwater was not encountered, while in another boring groundwater was encountered within 5 feet bgs.

Metals

Analytical results for two samples are presented in Table 4.3.12.a. Barium (0.1 mg/L), cobalt (0.0055 mg/L), molybdenum (0.024 mg/L), nickel (0.022 mg/L), and zinc (0.014 mg/L) were detected in sample SEB12+715W-W. Lead was detected at 0.025 mg/L, in sample SEB12+900W-W. No metals exceeded General NPDES Permit limits. No other metals were detected.

Pesticides and PCBs

Pesticides and PCBs were not detected in the sample collected from boring SEB12+715W. The other sample collected from boring SEB12+900W in year 2000 was not analyzed for pesticides or PCBs.

Volatile Organic Compounds

Analytical results for two samples are presented in Table 4.3.12.c. 1,1-Dichloroethane (0.00083 mg/L), 1,2-Dichloroethane (0.00057 mg/L) and 1,1,1-Trichloroethane (0.0029 mg/L) were reported in sample SEB12+715W-W. The 1,2-Dichloroethane concentration exceeded the General NPDES Permit discharge limit of 0.0005 mg/L. No VOCs were detected above reporting limits in sample SEB12+900W-W.

Semi-Volatile Organic Compounds

SVOCs were not detected above reporting limits in sample SEB12+715W-W. The other sample collected in year 2000 from SEB12+900W-W was not analyzed for SVOCs.

Petroleum Hydrocarbons

Petroleum hydrocarbons were not detected above reporting limits for sample SEB12+715W-W or SEB12+900W-W.

4.3.12.3 Discussion

4.3.12.3.1 Extent of Soil Contamination

The analytical data indicates that lead and mercury concentrations did not exceed the respective TTLCs in the borings drilled on the levee adjacent to MacPhee/Barbieri Property. Mercury was detected above ten times the STLC in the sample collected from boring SEB13+150W. Based on the soluble mercury data from samples collected from other parts of the river alignment, it appears that mercury is not soluble.

TPHd was detected in samples collected from borings SEB12+690W, SEB12+765W, and SEB13+150W, with concentrations ranging from 3.3 to 8.1 mg/kg.

4.3.12.3.2 Extent of Groundwater Contamination

Groundwater was collected in two locations. Lead was detected slightly above the MCL in sample SEB12+900W-W. The VOCs were detected near the northern edge of the property. The concentration of 1,2-dichloroethane detected in the sample collected from boring SEB12+715W-W exceeded the General NPDES Permit discharge limits. The lead and 1,2 dichloroethane may be related to the leaking underground storage tanks (USTS) that were removed from adjacent properties in the past.

4.3.12.3.3 Impacts to Construction

Based on the limited information obtained from this investigation, it appears that 1,2 dichloroethane and lead may have impacted groundwater underlying the existing levee adjacent to the MacPhee/Barbieri Property at concentrations near or slightly above the regulatory threshold limits. If levee modification is planned which involves excavation of soils to the water table and dewatering is necessary during construction, the pumped groundwater may require treatment prior to discharge into the river.

4.3.12.4 Feasibility Study Results

The extent of affected groundwater and soil is unknown. A feasibility study of the levee area is contained in the Embankment Section (Section 4.2).

4.3.12.5 Conclusions

Based on the data obtained during this property investigation, it appears that VOCs above the General NPDES discharge limits in groundwater exist beneath the levee. Additional assessment should need to be performed in order to better characterize the extent of affected soil and groundwater to determine the need for groundwater treatment and/or special disposal requirements and estimated costs.

4.3.12.6 Recommendations

If excavation of soils beneath and adjacent to the levee is required for the Project, Kleinfelder recommends an additional groundwater investigation for this property to confirm and better delineate soil and groundwater contamination and verify depths of groundwater. If groundwater is encountered in levee excavations, dewatering is needed and groundwater contaminants are above NPDES discharge limits then groundwater treatment may be required prior to discharge.

Management of impacted groundwater should follow guidelines in the Soil and Groundwater Management Plan.

4.3.13 Station No. 14+015W to 14+501W – City of San Jose (APN 97-25-051)

The City of San Jose property is located adjacent to the west bank of the Guadalupe River between the Guadalupe River and U.S. Highway 101 (Plate 4.3.13). Initially, the District planned to acquire a portion of this property for a bypass channel or for wetland mitigation for the construction of a flood protection project. In late year 2000, it was determined that the District may not acquire a portion of the property.

4.3.13.1 Work Performed

The City of San Jose property was identified as a property of concern during the Level I Investigation (District, 1996) due to past use of the property for agricultural activities. A reconnaissance was performed on September 3, 1999. The property was vacant at this time. Kleinfelder drilled five soil borings (SEB14+115W, SB14+171W, SEB14+228W, SB14+298W and SEB14+368W) on September 14 and 15, 1999. Borings SEB14+115W, SEB14+228W and SEB14+368W were completed at the toe of the levee to depths of 19.5, 26 and 26 feet bgs, respectively, using a direct push drill rig. Boring SEB14+115W was completed at 19.5 feet bgs due to refusal. Borings SB14+171W and SB14+298W were completed within approximately 50 feet of the toe of levee at a depth of 5 feet bgs using a hand auger.

Soil encountered in both borings consisted primarily of clay and sandy clay. Thin sandy layers were encountered below 18 feet bgs in borings SEB14+298W and SB14+368W. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.4 to 0.5 m (1.5 to 2.0 feet) – Title 22 metals, PAHs and pesticides and PCBs;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals, PAHs and pesticides and PCBs;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, PAHs and pesticides and PCBs;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals, PAHs and PCBs;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals, PAHs and PCBs;

- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals, PAHs and PCBs;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals, PAHs and PCBs; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals, PAHs and PCBs;

Three groundwater samples were collected from borings SEB14+115W, SEB14+298W and SEB14+368 and submitted for analysis of PAHs. Groundwater samples for Title 22 metals and pesticide analyses were also collected but placed on hold pending soil analytical results.

Additional investigation of the property was performed to delineate the extent of metals and pesticides found on the property. On September 28, 2000, Kleinfelder advanced four additional soil borings on City of San Jose property. The borings were located to the west approximately 25 meters (75 feet) from the top of the levee into the property. SB14+050W, SB14+150W, SB14+250W and SB14+350W were completed on September 28, 2000 using a direct-push drill rig to a depth of 7 feet bgs. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet)- Title 22 Metals, soluble mercury (Hg), DDT, DDE, DDD;
- 0.8 to 0.9 m (2.5 to 3.0 feet)- Title 22 Metals, soluble Hg, DDT, DDE, DDD; and
- 1.5 to 2.0 m (5.0 to 6.5 feet)- Title 22 Metals, soluble Hg, DDT, DDE, DDD;

4.3.13.2 Analytical Results

The following sections summarize the results of analyses of 37 soil samples and three groundwater samples collected from the levee adjacent to the City of San Jose property.

4.3.13.2.1 Soil

Metals

Analytical results for 37 soil samples are presented in Table 4.3.13.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Arsenic was detected in 35 samples and barium was detected below their respective TTLC and ten times the STLC in all samples with concentrations ranging from 1.6 to 12 mg/kg and 41 to 200 mg/kg, respectively. Beryllium was detected below TTLC and ten times the STLC in 24 samples, with concentrations ranging from 0.5 to 0.77 mg/kg. Cobalt and copper were detected below their respective TTLC and ten times the STLC in all samples with concentrations ranging from 3.6 to 15 mg/kg and 11 to 33 mg/kg, respectively.

Chromium was detected below the TTLC in all samples, ranging from 15 to 71 mg/kg, and mercury was detected in all samples, ranging from 0.05 to 25 mg/kg. The TTLC for mercury was exceeded in one sample at a concentration of 25 mg/kg. Mercury was detected in three of the 12 samples collected to delineate the extent of mercury found in samples collected in 1999. Concentrations exceeding ten times the STLC were detected in samples from borings SB14+050W, SB14+150W, and SB14+350W. The twelve additional samples were analyzed for soluble mercury. Soluble mercury was not detected above the reporting limit in any of the samples.

Lead was detected below the TTLC and below ten times the STLC in all samples except one at concentrations , ranging from 2.8 to 19 mg/kg. Lead was detected above ten times the STLC in sample SB14+350W-1 at a concentration of 27 mg/kg. All other metals reported in Table 4.3.13.a were detected in all samples at concentrations below their TTLC and ten times the STLC.

Pesticides and PCBs

Analytical results for 37 soil samples are presented in Table 4.3.13.b. As noted in Section 4.3.13.1 five soil borings were drilled in September 1999 (Phase I) and four borings were drilled in September 2000 (Phase II) to collect soil samples for analyses to delineate the extent of pesticides found during Phase I. The approximate impacted area is shown in Plate 4.3.13.

Dieldrin was detected below TTLC and STLC in four samples. 4,4-DDD was detected in 14 samples ranging from 0.0039 to 0.22 mg/kg. 4,4-DDE was detected in 21 samples ranging from 0.0023 to 0.86 mg/kg, and 4,4-DDT was detected in 17 samples ranging from 0.015 to 1.3 mg/kg. The combined concentrations exceeded the TTLC (1.0 mg/kg) for 4,4-DDT and its breakdown products in samples SEB14+115W-2.5 (1.1 mg/kg), SB14+150W-3 (1.3 mg/kg), and SEB14+228W-4.5 (0.58 mg/kg). No other pesticides were detected. The soil sample collected at 2.5 feet bgs in boring SEB14+115W was analyzed for soluble pesticides (4,4-DDE, 4,4-DDT, and 4,4-DDD). No soluble pesticides were reported. PCBs were not detected above reporting limits in any of the soil samples.

Semi-Volatile Organic Compounds

Analytical results for 25 soil samples are presented in Table 4.3.13.c. Benzo(a)pyrene was detected in samples collected from borings SEB14+115W (0.025 mg/kg at 2.5 feet), SEB14+228W (0.038 mg/kg at 4.5 feet), SB14+298W (0.024 mg/kg at 4.5 feet), and SEB14+368W (0.037 mg/kg at 2.5 f2eet). This compound does not have an established TTLC or STLC, but it does have a USEPA Region 9 preliminary remediation goal (PRG) (0.61 mg/kg), which was not exceeded. No other SVOCs were reported in the samples analyzed.

4.3.13.2.2 Groundwater

Groundwater was encountered at 15, 14 and 19 feet bgs in borings SEB14+115W, SEB14+228W and SB14+368W, respectively. The chemical analysis results are summarized in the following sections.

Metals

Analytical results for three groundwater samples are presented in Table 4.3.13.a. Barium, molybdenum, and nickel were detected in water samples collected from borings SEB14+115W(0.15, 0.052 and 0.012 mg/L, respectively), SEB14+228W (0.11, 0.02 and 0.0052 mg/L, respectively), and SEB14+368W (0.093, 0.026 and 0.0064 mg/L, respectively). Selenium was reported in the water samples from SEB14+115W (0.02 mg/L) and SEB14+368W (0.027 mg/L). None of the detected concentrations exceeded General NPDES Permit discharge limits or MCLs.

Pesticides and PCBs

Pesticides and PCBs were not detected above the reporting limits in groundwater samples obtained from borings SEB14+115W, SEB14+228W, and SEB14+368W.

Semi-Volatile Organic Compounds

SVOCs were not detected in any of the groundwater samples collected from the property.

4.3.13.3 Discussion

4.3.13.3.1 Extent of Soil Contamination

The analytical data for metals indicated that one sample concentration (SB14+350W-6) from the City of San Jose property) exceeded the TTLC for mercury. Plate 4.3.13 shows the location of this borehole. Mercury exceeding ten times the STLC was detected in 11 shallow samples. However, based on the soluble mercury data collected in this investigation and from other parts of the river alignment, it appears that none of the mercury is soluble.

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were detected with combined concentrations that exceeded the TTLC in samples SEB14+115W-2.5 (1.1 mg/kg), SB14+150W-3 (1.3 mg/kg), and SEB14+228W-4.5 (0.58 mg/kg). The combined concentration of these compounds was less than the TTLC in other samples collected from the property. Plate 4.3.13 shows the general area that high 4,4-DDE, 4,4-DDD and 4,4-DDT was detected. Dieldrin was detected in four soil samples below both its TTLC and STLC. Because the property was used for agriculture in the past, pesticides are likely to be widespread.

Benzo(a)pyrene was detected in samples collected from borings located at the edge of the levee SEB14+115W (0.025 mg/kg at 2.5 feet), SEB14+228W (0.038 mg/kg at 4.5 feet), SEB14+298W (0.024 mg/kg at 4.5 feet) and SEB14+368W (0.037 mg/kg).

4.3.13.3.2 Extent of Groundwater Contamination

Barium, molybdenum, and nickel were reported in the groundwater samples collected from borings SEB14+115W(0.15, 0.052 and 0.012 mg/L, respectively), SEB14+228W (0.11, 0.02 and 0.0052 mg/L, respectively), and SEB14+368W (0.093, 0.026 and 0.0064 mg/L, respectively). Additionally, selenium was reported in samples collected from SEB14+115W (0.02 mg/L) and SEB14+368W (0.027 mg/L). These values are below General NPDES Permit discharge limits and MCL concentrations for these compounds. No pesticides or SVOCs were reported in the groundwater samples collected from the City of San Jose Property.

4.3.13.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides (specifically 4,4-DDE, 4,4-DDD and 4,4-DDT) have impacted the soil underlying the City of San Jose Property at combined concentrations above the TTLC. Also, mercury was detected in relatively high concentrations in soil and mercury exceeded the TTLC at one location. The results indicate that special handling of soils in regard to any excavation and disposal in these areas will be required if the District excavates the levee embankment or acquires the property for wetland mitigation. Also, additional testing may need to be conducted to confirm and determine the extent of contamination if the District excavates the levee or acquires the property. Excavated soil may require disposal at a Class I (hazardous) landfill, depending on the results of the subsequent testing. The pesticide concentrations may limit the reuse of the soil.

4.3.13.4 Feasibility Study Results

The District may acquire this property for wetland mitigation. Under the current plan, the City of San Jose property may become a constructed wetland. It was observed that soils on the City of San Jose property are impacted with pesticides and mercury. Generally, where pesticide impacts were seen, mercury impacts also were seen in the same samples at this property.

It has been assumed that cleanup goals for mercury and DDT derivatives at this property are those stated for wetlands creation (non-cover) in Regional Board Resolution 92-145 (Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse). As such, cleanup goals are assumed to be the following:

- Mercury: For mercury, a cleanup goal of 1.3 mg/kg was assumed; and
- Pesticides: For DDT and derivatives, a cleanup goal of 0.1 mg/kg was assumed.

Based on these cleanup goals, it has been assumed that the entire site will be excavated to a depth of 1.5 meters below existing grade for either of the above planned uses. Such activities (wetland mitigation) will fall under the jurisdiction (primarily) of the California Department of Fish and Game, Corps, and the RWQCB. Although data is not adequate to characterize the entire site for remediation, Kleinfelder has assumed that approximately half of the site would need to be excavated due to environmental impacts in order to meet the above cleanup goals. If the area between the levee and the property is included, then the total soil volume exceeding cleanup goals would be approximately 60,000 cubic meters. The extent of soils exceeding hazardous limits (TTLC) for pesticides, shown on Plate 4.3.13, is estimated to be approximately 15,000 cubic meters or approximately one fourth of the total impacted soil volume. It has been assumed that no additional costs will be incurred due to any groundwater impacts.

Kleinfelder screened the technologies presented in Section 5, and developed a conceptual approach for remediation of near-surface soils at the site. Because soils are impacted with both organic and inorganic materials, on-site treatment was deemed to be more costly than excavation and off-haul. It has been assumed that the excavation work will be performed by a licensed hazardous substance removal contractor, and that soils are off-hauled for disposal either as California-hazardous waste (i.e., not RCRA waste) or Class II non-hazardous waste. With these assumptions, the estimated cost for excavation, transportation and disposal of soils (without treatment) from the City of San Jose property is $7.1 million (see Table 4.3.13d).

Disposal prices are based on competitive verbal quotes from Philip Environmental Services and Decon Environmental, waste disposal brokers with pre-negotiated soil disposal prices, and include State and County disposal taxes. Disposal costs for a given option are relatively fixed at the present time, but over time are likely to change, and should be negotiated in advance of the Project.

4.3.13.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there may be environmental impacts to the Project construction due to the presence of pesticides and mercury if the District excavates the levee or acquires the property. Because of the concentrations of pesticides reported, construction workers should take precautions (i.e. dust control measures, breathing protection) to minimize contact with and inhalation of the soil beneath the property. Any excavation and disposal may require special handling and disposal.

4.3.13.6 Recommendations

If the District acquires the property, Kleinfelder recommends additional investigation to better assess the limits of pesticide and mercury affected soil prior to construction on the City of San Jose property. If the District does not acquire the property, we do not recommend additional investigation on the site. Should the District plan excavation of the levee adjacent to the property, such work should follow guidelines included in a Soil and Groundwater Management Plan to be prepared by Kleinfelder. The levee area was generally addressed in the Embankment Area Section of this report in Section 4.2.1.

4.3.14 Station No. 14+445E to 14+501E – Levee adjacent to ATMEL Corporation (APN 97-25-011 and 078)

The ATMEL property is located adjacent to the east bank of the Guadalupe River between the Guadalupe River and U.S. Highway 101 (Plate 4.3.14). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the refined project design alternative excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified however the levee area has been addressed with the Embankment Area in Section 4.2.1 of the report.

4.3.14.1 Work Performed

The ATMEL property was identified as a property of concern during the Level I Investigation (District, 1996) due to the past use agricultural activities. A reconnaissance was performed on September 15, 1999. Kleinfelder drilled five soil borings, SB14+455E, SB14+470E, SB14+480E, SB14+485E and SB14+495E, on the property on September 17 and 21, 1999. Borings SB14+470E, SB14+4880E and SB14+485E were completed at a depth of 21 feet bgs using a direct-push drill rig. A hand auger was used to advance the other two borings to a depth of 5 feet bgs.

Soil encountered consisted primarily of clay and sandy clay. A two to three foot thick layer of clayey sand was encountered at approximately 12 feet bgs in borings SB14+470E and SB14+480E. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.4 to 0.5 m (1.0 to 1.5 feet) – SVOCs, Title 22 metals, and pesticides and PCBs;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Pesticides and PCBs;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – SVOCs, Title 22 metals and pesticides and PCBs;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – SVOCs; and

- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals.

A reconnaissance groundwater sample also was collected from each boring and submitted for analysis of SVOCs. Groundwater samples for Title 22 metals and pesticide analyses also were collected and placed on hold pending soil analytical results.

4.3.14.2 Analytical Results

The following summarizes the results of analyses of 24 soil samples and three groundwater samples collected from the levee adjacent to the ATMEL property. The analytical results are summarized in the following sections.

4.3.14.2.1 Soil

Metals

Analytical results for 37 soil samples are presented in Table 4.3.14.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded in samples collected from this property. Chromium, lead, and mercury concentrations exceeded ten times the STLCs.

Arsenic was detected in 18 samples and barium was detected in all samples with concentrations ranging from 1.2 to 17 mg/kg and 41 to 240 mg/kg, respectively. Beryllium was detected in nine samples with concentrations ranging from 0.5 to 0.64 mg/kg. Cobalt was detected in all samples ranging from 5 to 14 mg/kg, and copper was detected in 19 samples ranging from 12 to 34 mg/kg.

Chromium was detected in 19 samples with concentrations ranging from 22 to 64 mg/kg. Ten of the chromium concentrations, which were detected in shallow samples (4.5 feet deep or less), exceeded 10 times the STLC. Lead was detected in 18 samples with concentrations ranging from 3.2 to 67 mg/kg. The lead concentration detected in sample SB14+480E-1 (67 mg/kg) exceeded ten times the STLC. Mercury was detected in 15 samples with concentrations ranging from 0.055 to 16 mg/kg. Five of the mercury concentrations, which were detected in shallow samples (2.5 feet deep or less), exceeded ten times the STLC for mercury.

Nickel, vanadium and zinc were detected in all samples with concentrations ranging from 31 to 110 mg/kg, 31 to 110 mg/kg, and 29 to 63 mg/kg, respectively.

Pesticides

Analytical results for 15 samples are presented in Table 4.3.14.b. 4,4-DDD was detected in samples SB14+485E-1.5 (0.02 mg/kg), SB14+485E-2.5 (0.0024 mg/kg), and SB14+495E-1.5 (0.19 mg/kg). 4,4-DDE was detected in nine samples ranging from 0.0022 to 2.3 mg/kg. The highest concentration (2.3 mg/kg), detected in sample SB14+480E-1, exceeded the TTLC (1.0 mg/kg) and the PRG (1.7 mg/kg). 4,4-DDT was detected in four samples ranging from 0.011 to 1.2 mg/kg. The highest concentration (1.2 mg/kg), detected in sample SB14+480E-1, exceeded the TTLC. The combined concentrations of 4,4-DDT and its breakdown products exceeded the TTLC (1.0 mg/kg) in samples SB14+480E-1 (3.5 mg/kg) and SB14+495E-1.5 (1.77 mg/kg). No other pesticides were detected

Semi-Volatile Organic Compounds

Analytical results for 17 samples are presented in Table 4.3.14.c. Benzo(a)pyrene was detected in samples SB14+480E-1 (0.029 mg/kg), SB14+485E-1 (0.037 mg/kg), SB14+495E-1 (0.046 mg/kg), and SB14+495E-2.5 (0.046 mg/kg). Pyrene was detected in sample SB14+495E-2.5 (0.11 mg/kg). The two SVOCs was detected below the PRGs. TTLCs and STLCs have not been established for Benzo(a)pyrene or Pyrene.

4.3.14.2.2 Groundwater

Groundwater was encountered at 10.5, 9 and 10 feet bgs in borings SB14+470E, SB14+480E and SB14+485E. Sample SB14+470E-W was analyzed for metals, and samples SB14+480E-W and SB14+485E-W were analyzed for mercury. Barium (0.041 mg/L), molybdenum

(0.016 mg/L), and nickel (0.0098 mg/L) were reported in sample SB14+470E-W at concentrations below their MCLs. The only pesticide detected in sample SB14+470E-W was 4,4-DDE at a concentration of 0.000091 mg/L. No MCL has been established for this compound. SVOCs were not detected in groundwater samples SB14+470E-W, SB14+480E-W, or SB14+485E-W.

4.3.14.3 Discussion

4.3.14.3.1 Extent of Soil Contamination

Chromium, lead, mercury, and pesticides occur in the shallow soil (less than 6 feet). Chromium (in 10 samples), lead (in one sample), and mercury (in 15 samples) concentrations exceeded ten times the STLCs. The mercury is probably naturally occurring and based on solubility analysis of samples collected in this investigation from elsewhere along the alignment, the mercury is not soluble.

Pesticides are likely to be present across the property as the property has been and continues to be used for agriculture. The reported concentrations of 4,4-DDT, 4,4-DDE and 4,4-DDD exceeded their TTLC in two soil samples (SB14+480E-1 and SB14+495E-1.5). Similar concentrations can be expected sporadically across the property due to uneven application of pesticides during agricultural applications.

4.3.14.3.2 Extent of Groundwater Contamination

No constituents were reported in groundwater samples exceeding regulatory threshold limits.

4.3.14.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides have impacted the soil underlying the ATMEL Property at concentrations above regulatory threshold limits. Kleinfelder feels that if this property were to be acquired and excavated, it would likely require special handling in regard to disposal. Excavated soil may require disposal at a Class I (hazardous) and reuse for construction will not be allowed. However, as the District currently does not anticipate acquisition, this property will likely have little impact on the Project.

4.3.14.4 Feasibility Study Results

As the District does not anticipate acquisition, no feasibility study is necessary.

4.3.14.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are environmental impacts on this property due to the presence of pesticides above the TTLC. However, conditions on this property will likely have little impact on the Project. If excavation is planned to raise the levee, soil samples should be taken to verify pesticide impacts do not extend to the excavation area. Also, construction workers should take precautions (i.e. dust control measures, breathing protection) to minimize contact with and inhalation of the soil beneath the levee.

4.3.14.6 Recommendations

As the District is not considering acquisition of a portion of this property no additional investigation is recommended. If the District does acquire a portion of the property, Kleinfelder recommends an additional investigation to confirm and delineate the extent of pesticides in shallow soil at this property. Any excavation, handling and disposal of soils as part of the Project should follow guidelines in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.4 Properties Added due to Potential Property Acquisition

4.4.1 Station No. 8+300E to 8+490E – Levee Adjacent to Sylvia (APN 97-02-042)

The Sylvia property is located adjacent to the east bank of the Guadalupe River between Highway 237 and Tasman Drive (Plate 4.4.1). The District initially planned to acquire a 30 foot portion of this property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. Since mercury was identified as a concern on the property, two additional soil borings were installed on the inboard toe to ensure that mercury on the property will not impact project construction.

4.4.1.1 Work Performed

The Sylvia property was not identified as a property of concern during the Level I Investigation (District, 1996). The property was investigated because the District proposed acquisition of a portion of the property. The property was investigated because the District proposed acquisition of portion of the property. The purpose of the investigation on the Sylvia property was to assess the potential impact of site conditions on property acquisition or construction activities. Because no site-specific information is known, Kleinfelder recommended the entire suite of landfill constituents of concern be assessed because of its proximity to landfill areas.

Kleinfelder drilled two soil borings, SB8+345E and SB8+440E, on the levee adjacent property on August 25, 1999. The borings were completed at depths of 45.5 and 20.5 feet below TOL, respectively. Due to the limited space for equipment access, the borings were placed on the outward side of the levee road. A hollow stem auger was used to advance the borings due to the proximity of the property to an identified archeological area.

Soil encountered in both borings consisted of clay. Thin sandy layers and glass fragments were encountered in boring SB8+345E and SB8+440E at approximately 4 feet bgs, respectively. The boring logs are presented in Appendix A.

Soil samples were collected from boring SB8+440E and submitted for analysis as described below:

- 0.3 to 0.6 m (1.5 to 2.0 feet) – Title 22 metals and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals and pesticides;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals and pesticides;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and pesticides;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals and pesticides; and
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals.

Soil samples were collected from boring SB8+345E and submitted for analysis as described below:

- 0.3 to 0.6 m (1.5 to 2.0 feet) – Title 22 metals and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals, asbestos, and pesticides;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals and pesticides;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals and pesticides;
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals and pesticides;
- 9.0 to 9.1 m (29.5 to 30.0 feet) – Title 22 metals;
- 11.5 to 11.6 m (34.5 to 35.0 feet) - Title 22 metals;
- 13.1 to 13.3 m (39.5 to 40.0 feet) - Title 22 metals; and
- 14.8 to 15.0 m (44.5 to 45.0 feet) - Title 22 metals;

A groundwater sample was also collected from each boring and submitted for analysis of VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses was also collected from SB8+345E and placed on hold pending soil analytical results. It was not possible to collect enough water for metals or pesticide analyses from SB8+440E because the soil was so impermeable.

On September 29, 2000, Kleinfelder advanced two additional borings on the levee adjacent to Sylvia (APN 97-02-042). SEB 8+300E and SEB8+490E were completed on September 29, 2000 on the inboard top of the levee using a direct push drill rig to a depth of 20 feet bgs to confirm that mercury on Sylvia property would not impact project construction. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.3 to 0.6 m (1.5 to 2.0 feet) –Total and soluble Hg;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Total and soluble Hg;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Total and soluble Hg;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Total and soluble Hg;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Total and soluble Hg. For SEB8+490E a sample for mercury parameters was collected at the 15 foot interval. Mercury parameters consist of sulfide, total organic carbon, iron, grain size (sieve and hydrometer analysis) and moisture content; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Total and soluble Hg.

The 5.0 and 15.0 foot samples were placed on hold after collection pending results of the analyses of samples collected above or below.

4.4.1.2 Analytical Results

The following summarizes the analysis results for soil samples and one groundwater sample collected from the Sylvia property. The analytical results are summarized in the following sections.

4.4.1.2.1 Soil

Metals

Analytical results for 23 soil samples are presented in Table 4.4.1.a. Seventeen samples were analyzed for Title 22 metals, and six samples collected from borings SEB8+300E and SEB8+490E were analyzed for mercury only. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous).

Arsenic and lead were detected in 17 samples with concentrations ranging from 1.9 to 57 mg/kg and 4.9 to 140 mg/kg. Only one of the 17 samples exceeded ten times the STLC. The highest concentration of arsenic (57 mg/kg) and the highest concentration of lead (140 mg/kg) were detected in sample SB08+440E-19.5, exceeding ten times the STLCs in both cases. The same sample was analyzed for soluble arsenic and soluble lead by WET analyses, and neither chemical was detected above the reporting limits. Chromium was detected in all samples for which it was analyzed, with concentrations ranging from 36 to 68 mg/kg. Mercury was detected in all samples, with concentrations ranging from 0.064 to 31 mg/kg. The mercury concentration detected in sample SB08+345E-14.5 (31 mg/kg) exceeded the TTLC. Mercury concentrations detected in 11 additional samples from all four borings exceeded 10 times the STLC. Six samples were analyzed for soluble mercury, which was not detected above the reporting limit in any samples.

Barium was detected in 17 samples and beryllium was detected in two samples with concentrations ranging from 37 to 180 mg/kg and 0.51 to 0.53 mg/kg, respectively. Cobalt and copper were detected in all samples for which analyses were performed with concentrations ranging from 5.7 to 15 mg/kg and 18 to 44 mg/kg, respectively.

Molybdenum was detected in one sample (1.2 mg/kg), and nickel was detected in all samples (42 to 100 mg/kg). Selenium (3.6 to 5.8 mg/kg), vanadium (24 to 41 mg/kg), and zinc (40 to 120 mg/kg) were detected in all samples for which analyses were performed.

Pesticides and PCBs

Analytical results for three samples collected from boring SB08+440E are presented in Table 4.4.1.b. 4,4-DDE and 4,4-DDD were detected in the three samples collected from boring SB08+440E with concentrations ranging from (0.0052 to 0.078 mg/kg) and (0.0057 to 0.13 mg/kg). 4,4-DDT was detected in sample SB8+440E-14.5 (0.025 mg/kg). The combined concentrations for 4,4-DDT and its breakdown products are below the TTLC.

Asbestos

Asbestos was reported at less than 1 % (trace) in the analyzed soil samples. This is below the hazardous waste threshold for asbestos.

4.4.1.2.2 Groundwater

Groundwater was encountered at a depth of 19 feet bgs in each of the borings. Pesticides, PCBs and SVOCs were not detected in either groundwater sample. No other analysis was performed.

4.4.1.3 Discussion

4.4.1.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations, with the exception of mercury, do not exceed the respective TTLCs in soil beneath the levee adjacent to the Sylvia Property. A mercury concentration detected in sample SB08+345E-14.5 exceeded the TTLC and 11 additional concentrations exceeded ten times the STLC in samples collected from all four borings. For six of the 11 samples where mercury was detected at ten times the STLC, the WET was performed. No soluble mercury was detected in the WET analyses. Consequently, the high mercury concentrations (in excess of TTLC) may be limited to the immediate vicinity of boring SB8+345E at 14.5 feet.

Lead and arsenic were detected in one sample (SB8+440E-19.5) at greater than ten times the STLC. A WET performed on the sample found no soluble lead or arsenic.

The combined concentrations of pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were detected below the TTLC (1.0 mg/kg, total) in boring SB8+440E.

4.4.1.3.2 Extent of Groundwater Contamination

No Pesticides or SVOCs were reported above laboratory reporting limits in any of the groundwater samples collected from beneath the property.

4.4.1.3.3 Impacts to Construction

Currently the District does not anticipate acquisition of the property but may modify the embankment as part of the Project. If the District acquires a portion of this property or excavates the outboard side the levee, the project may be impacted due to the elevated presence of metals. In such a case construction workers may be exposed to elevated levels of metals, and special handling of soil, dust control measures, and training may be required.

4.4.1.4 Feasibility Study Results

Because the District does not plan to acquire the property, Kleinfelder will not perform a feasibility study for soil or groundwater management for this property.

4.4.1.5 Conclusions

Based on the data obtained during this investigation, it is Kleinfelder's opinion that there may be environmental impacts in soil beneath the outboard levee due to the presence of elevated concentrations of mercury. Groundwater does not appear to be impacted.

4.4.1.6 Recommendations

If the District acquires a portion of the property or excavates beneath the outboard levee in the vicinity of SB8+345E Kleinfelder recommends further soil investigations to confirm and delineate the mercury detected at 19.5 feet beneath the outboard top of levee at location SB8+345E. If the District plans no construction or acquisition of the property no further actions are recommended. If excavation is performed guidance provided in a Soil and Groundwater Management Plan to be prepared by Kleinfelder should be followed.

4.4.2 Station No. 9+260E to 10+110E – SGA Development Partnership (APN 97-54-015, 016, 017, 018, 019, 020, 021 and 02)

The SGA Development Partnership Ltd. properties are located adjacent to the east bank of the Guadalupe River between Tasman Drive and Montague Expressway (Plate 4.4.2). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed.

4.4.2.1 Work Performed

The SGA Development Partnership Ltd. properties were not considered to be a concern following the Level I Investigation (District, 1996). A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. The reconnaissance identified an area that may have contained diesel fuel at station 9+838E (APN 97-54-020). A cage-like structure was observed at this location. A follow-up property reconnaissance was performed on September 7, 1999. No additional concerns were noted. Kleinfelder recommended that agricultural constituents of concern (metals, pesticides, and herbicides), be analyzed due to the probable past use of the property for agricultural purposes. In addition, TPHd analysis was recommended in samples from the boring nearest the "cage."

Kleinfelder advanced six soil borings, SB9+300E, SB9+425E, SEB9+570E, SB9+630E, SEB9+812E, and SB9+998E, on the property on September 13 and 14, 1999. The borings were completed at a depth of 26 feet below grade using direct-push methods. Soil encountered in the borings consisted primarily of clay with 2 to 3 feet thick interbeds of clayey sand. The sand layers had increasing amount of silt in the upstream borings. The boring logs are presented in Appendix A.

Soil samples were collected in each of the borings at the approximate depths described below:

- 0.3 to 0.4 m (1.0 to 1.5 feet) – Title 22 metals and pesticides;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and pesticides;
- 1.3 to 1.4 m (4.0 to 4.5 feet) – Title 22 metals and pesticides;

- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals;
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals; and
- 7.5 to 7.6 m (24.5 to 25.0 feet) – Title 22 metals.

Soil samples collected from boring SEB9+812E were additionally analyzed for TPHd.

A reconnaissance groundwater sample was collected from each boring and submitted for analysis for TPHd. Groundwater samples for Title 22 metals and pesticide analyses also were collected from each boring and placed on hold pending soil analytical results.

4.4.2.2 Analytical Results

The following summarizes the analysis results of 42 soil samples and 6 groundwater samples collected from the SGA property. The analytical results are presented in Tables 4.4.2.a to 4.4.2.c and are summarized in the following sections.

4.4.2.2.1 Soil

Metals

Analytical results for 42 soil samples are presented in Table 4.4.2.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Arsenic and lead were detected in 41 samples with concentrations ranging from 1.6 to 110 mg/kg and from 2.8 to 330 mg/kg, respectively. The two highest concentrations of arsenic (75 mg/kg in sample SB09+300E-2.5 and 110 mg/kg in sample SB09+630E-1) exceeded ten times the STLC. Soluble arsenic was not detected above the reporting limit in sample SB09+630E-1.

Lead concentrations exceeded 10 times the STLC in samples SB09+300E-1 (130 mg/kg), SB09+300E-2.5 (280 mg/kg), SB09+425E-1 (160 mg/kg), SB09+630E-1 (330 mg/kg), and SEB09+812E-2.5 (85 mg/kg). Samples SB09+300E-2.5 and SB09+630E-1 were analyzed for soluble lead, and soluble lead was not detected above the reporting limit in either sample.

Chromium was detected in all samples with concentrations ranging from 4.7 to 71 mg/kg. Mercury was detected in 39 samples, with concentrations ranging from 0.053 to 13 mg/kg. Nine mercury concentrations detected in shallow (4.5 feet deep or less) samples collected from borings SB09+300E, SB09+425E, SB09+630E, SEB09+812E, and SB09+998E exceeded ten times the STLC. No soluble analyses for mercury were performed on any of the samples from this property.

Barium was detected in all samples and beryllium was detected in 10 samples with concentrations ranging from 21 to 340 mg/kg and 0.5 to 0.71 mg/kg, respectively. Cadmium was detected in one sample at 0.7 mg/kg. Cobalt and copper were detected in all samples with concentrations ranging from 2.7 to 14 mg/kg and 3 to 58 mg/kg, respectively.

Molybdenum was detected in four samples (1.1 to 2.8 mg/kg), and nickel was detected in all samples (5.4 to 140 mg/kg). Vanadium (14 to 41 mg/kg) and zinc (10 to 70 mg/kg) were detected in all samples.

Pesticides and PCBs

Analytical results for 18 samples are presented in Table 4.4.2.b. 4,4-DDD was detected in 13 samples with concentrations ranging from 0.0023 to 1.3 mg/kg. 4,4-DDE was detected in 16 samples ranging from 0.0026 to 3.4 mg/kg. 4,4-DDT was detected in eight samples with concentrations ranging from 0.011 to 2.6 mg/kg.

Combined concentrations of 4,4-DDT and its breakdown products exceeded the TTLC (1.0 mg/kg) in samples SB09+300E-1 (1.4 mg/kg), SB09+300E-2.5 (7.3 mg/kg), SB09+425E-1 (3.7 mg/kg), SB09+630E-1 (5.14 mg/kg), SEB09+812E-1 (1.68 mg/kg), and SB09+998E-1.5 (2.03 mg/kg). Soluble analyses for the pesticides 4,4-DDT, 4,4-DDE, and 4,4-DDD were performed on sample from boring SB9+998E-1.5. The results were below the reporting limit.

Petroleum Hydrocarbons

Analytical results for seven soil samples collected from boring SEB09+812E are presented in Table 4.4.2.c. The soil samples collected from boring SB9+812E were analyzed for TPHd, which was detected in all seven samples with concentrations ranging from 1.1 to 14 mg/kg.

4.4.2.2.2 Groundwater

Groundwater was encountered at depths ranging from 10 to 19 feet below grade. Barium, cobalt, molybdenum, nickel, vanadium and zinc were detected in at least one of the groundwater samples. Each of these metals was detected at concentrations below the established MCLs. Thallium (0.0074 mg/L) was detected at a concentration exceeding its MCL in sample SB9+300E-W. Pesticides and PCBs were not detected in the groundwater samples. TPHd was detected in six samples, with concentrations ranging from 0.051 to 0.076 mg/L in samples collected from borings SB9+300E, SB9+425E and SB9+630E which exceeds the General NPDES Permit discharge limits.

4.4.2.3 Discussion

4.4.2.3.1 Extent of Soil Contamination

The analytical data for metals indicates that the metals concentrations do not exceed their respective TTLCs. However, mercury (0.053 to 13 mg/kg), lead (2.8 to 330 mg/kg), and arsenic (1.6 to 110 mg/kg) exceeded ten times their respective STLCs in several soil samples. Based on the soluble mercury, lead and arsenic data from the soil samples collected from borings SB9+300E and SB9+630E and in other parts of the river alignment during this investigation, it appears that these metals are not soluble. Therefore, soil materials that may be encountered during excavation do not appear to be significantly impacted by metals contamination (i.e., hazardous).

The pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were detected above their TTLC in at least one sample from each of the six borings except SB9+570E. These pesticides were just below the TTLC in this boring. Soluble pesticides were not detected in a sample collected from boring SB09+998E-1.5. The probable source of these pesticides is the former usage of the property for agricultural purposes. Pesticides are expected to be present in the surface soils of the levee only.

The reported concentrations of TPHd may be attributable to a release from the emergency generator observed on the property or possibly naturally occurring organic compounds resulting from decomposition processes. The lateral extent of TPHd cannot be determined as soil samples from only one boring were analyzed.

4.4.2.3.2 Extent of Groundwater Contamination

The only constituent detected at a concentration that exceeds the MCL was thallium at a concentration of 0.0074 mg/L in boring SB9+300E. The source of thallium is not known; however, it may be a laboratory contaminant. TPHd was detected in groundwater samples collected from borings SB09+300E (0.054 mg/L), SB09+425E (0.076 mg/L), SB09+630E (0.051 mg/L). The TPHd results exceed the General NPDES discharge limits. These data may indicate the presence of a diesel plume located near Tasman Drive.

4.4.2.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides have impacted the surface soils at concentrations above the TTLC. If the property is acquired by the District and excavations are made into native soils the presence of pesticides in high concentrations will impact the project. If the District excavates between the levee near-surface soil materials will need to be managed as a hazardous waste and construction workers should follow appropriate health and safety protocols to assure worker safety. In addition, groundwater was found to contain TPHd in concentrations exceeding General NPDES discharge limits in three boreholes.

4.4.2.4 Feasibility Study Results

A feasibility study is indicated if the District plans excavation into native soils adjacent to this property as pesticide impacts are present. Groundwater may also need to be addressed if dewatering is necessary. Feasibility information for embankments is included with the Embankment Area in Section 4.2.

4.4.2.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there may be environmental impacts by pesticides in soils and diesel in groundwater. If the District acquires the property or plans excavation into the soil the soil may need to be managed as hazardous waste. Because of the concentrations of pesticides reported, construction workers should take precautions (i.e. dust control measures, breathing protection) to minimize contact with and inhalation of the soil beneath the levee.

4.4.2.6 Recommendations

If the District acquires a portion of the property or plans excavation into the soil on or adjacent to this property, Kleinfelder recommends further investigation on this property to confirm and delineate the extent of soil contamination by pesticides and diesel. Also, the depth to groundwater and extent of groundwater impacts in the excavation area should be investigated. If excavation, as part of project construction, will extend below the water table, and dewatering will be necessary, dewatering water will need to be treated prior to disposal in impacted areas. The District should consider construction in the summer or fall to reduce the possibility of encountering impacted groundwater. The guidance contained in the Soil and Groundwater Management Plan should be followed if excavation is anticipated.

4.4.3 Station No. 10+110E to 10+490E – KLA – Tencor Corporation (APN 97-06-049, 050, and 051)

The KLA – Tencor Corporation properties are located adjacent to the east bank of the Guadalupe River between Tasman Drive and Montague Expressway (Plate 4.4.3). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed.

4.4.3.1 Work Performed

The KLA – Tencor Corporation properties were not considered to be properties of concern during the Level I Investigation (District, 1996). A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. No issues of concern were observed although the site was observed to be adjacent to Cisco Systems and it was probably used in the past for agricultural purposes. The property was occupied by paved parking along the levee.

To assess potential impacts due to its past use for agriculture and its proximity to a manufacturing facility (Cisco), Kleinfelder advanced three soil borings, SB10+125E, SB10+210E, and SB10+447E, on the property on September 14 and 22, 1999. The borings were completed at a depth of 21, 18, and 20.5 feet bgs, respectively. The direct-push method was used to collect samples for chemical analysis.

Soil encountered in the borings consisted of clay. A clayey/silty sand was encountered in each of the borings between 12 and 14 feet bgs. Silty sand was encountered in boring SB10+447E between surface to 7 feet bgs which may be fill material. The boring logs are presented in Appendix A. Soil borings were marked with wood stakes and flagging to allow the locations to be surveyed by the District.

Soil samples were collected in each of the borings at the approximate depths and submitted to the analytical laboratory for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHd, and asbestos;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHd, and asbestos;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHd, and asbestos;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals, VOCs, SVOCs, and TPHd;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals, VOCs, SVOCs, and TPHd; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals, VOCs, SVOCs, and TPHd.

The exception to the sampling plan described above, was soil collected from boring SEB10+447E where the 2.9 to 3.0 m (9.5 to 10.0 feet) sample was analyzed only for Title 22 metals and asbestos. The 4.4 to 4.6 m (14.5 to 15.0 feet) sample was analyzed for the target compounds except for Title 22 metals, and the 5.9 to 6.1 (19.5 to 20.0 feet) sample was analyzed for Title 22 metals, TPHd, and asbestos. The reason for this difference was a modification to the sample analysis plan at the request of the District.

A reconnaissance groundwater sample also was collected from each boring and submitted for analysis for TPHd, VOCs and SVOCs. Groundwater samples for Title 22 metals and pesticide analyses also were collected from each boring and placed on hold pending soil analytical results. Containers for metals analysis were unpreserved because samples for metals were not filtered in the field. The laboratory performed the appropriate filtering prior to preserving.

4.4.3.2 Analytical Results

The following summarizes the analysis results of 16 soil samples and 3 groundwater samples collected from the KLA-Tencor Corporation property. The analytical results are presented in Tables 4.4.3.a to 4.4.3.e and are summarized in the following sections.

4.4.3.2.1 Soil

Metals

Analytical results for 16 soil samples are presented in Table 4.4.3.a. Metals concentrations in each soil sample were compared to their respective TTLC and STLC. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeds the STLC (i.e., considered hazardous).

Chromium was detected in all samples with concentrations ranging from 23 to 64 mg/kg. Mercury was detected in all samples with concentrations ranging from 0.072 to 12 mg/kg. Mercury concentrations exceeded ten times STLC in shallow (1 to 2.5 feet bgs) samples SB10+125E-1 (12 mg/kg), SB10+210E-2.5 (7.2 mg/kg), and SB10+447E-1 (3.5 mg/kg). Soluble analyses for mercury were not performed on samples from this property.

Arsenic was detected in all samples with concentrations ranging from 1.1 to 9.1 mg/kg. Barium was detected in all but one sample (SB10+447E-1). Barium concentrations ranged from 44 to 170 mg/kg. Beryllium was detected in seven samples (0.53 to 0.69 mg/kg). Cobalt and copper were detected in all samples (except SB10+447E-1) with concentrations ranging from 4.8 to 13 mg/kg and 16 to 32 mg/kg, respectively. Lead was detected in all samples (4.7 to 24 mg/kg).

Molybdenum was detected in four samples (1.1 to 1.7 mg/kg), and nickel was detected in all samples (except SB10+447E-1) 26 to 110 mg/kg. Vanadium (21 to 46 mg/kg) and zinc (38 to 62 mg/kg) were detected in all samples (except SB10+447E-1).

Pesticides

Analytical results for nine soil samples are presented in Table 4.4.3.b. Dieldrin was detected in sample SB10+447-1 (0.021 mg/kg). 4,4-DDD was detected in four samples (0.0044 to 0.08 mg/kg), 4,4-DDE was detected in five samples (0.021 to 0.34 mg/kg), and 4,4-DDT was detected in three samples (0.027 to 0.15 mg/kg). The combined concentrations of 4,4-DDT and its breakdown products ranged from 0.0524 to 0.35 mg/kg. All pesticide concentrations were below the TTLCs.

Volatile Organic Compounds

Analytical results for 14 soil samples are presented in Table 4.4.3.c. No VOCs were detected in the soil samples collected from the property.

Semi-Volatile Organic Compounds

Analytical results for 14 soil samples are presented in Table 4.4.3.d. Benzo(a)pyrene was detected in sample SB10+210E-1 (0.022 mg/kg). Phenol was detected in samples SB10+125E-14.5 (0.11 mg/kg), and SB10+210E-1 (0.14 mg/kg). No regulatory thresholds were exceeded.

Petroleum Hydrocarbons

Analytical results for seven soil samples are presented in Table 4.4.3.e. TPHd was detected in seven samples with concentrations ranging from 1.1 to 41 mg/kg. TPHg was not detected above the reporting limits for samples analyzed at the property.

Asbestos

Analytical results for six soil samples are presented in Table 4.4.3.f. Asbestos was not detected in any of the analyzed soil samples collected from the property.

4.4.3.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs. Groundwater samples collected from borings SB10+125E, SB10+210E, and SB10+447E were analyzed for metals, pesticides, VOCs, SVOCs, and petroleum hydrocarbons. Barium, molybdenum, nickel, and zinc were detected below MCLs and General NPDES Permit discharge limits. Pesticides and SVOCs were not detected in any of the groundwater samples. 1,1-Dichloroethane (0.0023 mg/L) and 1,1,1-Trichloroethane (0.00074 mg/L) were detected below MCLs and General NPDES Permit discharge limits in the sample collected from boring SB10+125E. TPHd was detected in the sample collected from boring SB10+210E at 0.077 mg/L. The TPHd result exceeded the General NPDES permit discharge limits.

4.4.3.3 Discussion

4.4.3.3.1 Extent of Soil Contamination

The analytical data for metals indicates that the metals concentrations do not exceed the respective TTLCs in the samples from the KLA-Tencor Corporation property. Mercury exceeded ten times the STLC. No samples for soluble mercury or chromium were analyzed for this property. However, based on soluble mercury data from samples collected during this investigation in other parts of the river alignment, it appears that the mercury is not readily soluble. Pesticides were reported in shallow soil samples from the property, but their concentrations are below their respective TTLCs.

TPHd was detected in all three borings drilled on the property at concentrations ranging from 1.1 mg/kg at 4.0 feet in boring SB10+125E to 41.0 mg/kg at 1.0 foot in boring SB10+210E. There are no specific regulatory limits for TPHd in soil; however, these concentrations are considered to be low.

Benzo(a)pyrene was detected in sample SB10+210E-1 at 0.022 mg/kg. Phenol was detected in two samples, SB10+125E-14.5 (0.11 mg/kg) and SB10+210E-1 (0.14 mg/kg). There are no TTLCs or STLCs established for benzo(a)pyrene or phenol. The reported concentrations of benzo(a)pyrene and phenol are considered low.

4.4.3.3.2 Extent of Groundwater Contamination

VOCs were reported in the groundwater sample from boring SB10+125E. 1,1-Dichloroethane and 1,1,1-Trichloroethane were detected at 0.0023 mg/L and 0.00074 mg/L, respectively. These concentrations are below their respective General NPDES Permit discharge limits.

TPHd was detected in sample SB10+210E-W at 0.077mg/L. The TPHd result exceeds the General NPDES Permit discharge limit.

4.4.3.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that there are no impacts on Project construction as a result of soil conditions on this property. If soil on this property were to be excavated, it is likely that it would not require special handling and excavated soil could be disposed at a landfill or reused for construction. However, low concentrations of VOCs were detected in groundwater and TPHd was detected at concentrations greater than the General NPDES Permit discharge limits. If the District excavations to below the water table an if dewatering is necessary for construction, groundwater treatment may be necessary.

4.4.3.4 Feasibility Study Results

As the District does not intend to acquire a portion of the property Kleinfelder will not perform a feasibility study for soil or groundwater management for this property. Feasibility study information relative to groundwater is contained in the Embankment Area Section (Section 4.2).

4.4.3.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are no significant soil impacts to the Project construction. The soil is not classified as a hazardous waste and does not require special handling. Low concentrations of VOCs were detected and TPHd was detected at concentrations greater than the General NPDES Permit discharge limits in groundwater in one boring. Treatment prior to discharge of any groundwater may be necessary.

4.4.3.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property. However, if excavation is contemplated as part of the project in this area, the depth to water and potential groundwater impacts related to VOCs and TPHd should be assessed.

The District should consider construction in the summer and fall to minimize the potential to encounter affected groundwater. Handling of any affected groundwater should be carried out following guidance in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.4.4 Station No. 11+843E to 12+060E – Renco Associates (APN 97-12-123, and 124)

The Renco Associates property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.4). The District initially planned to acquire a 20 foot portion of the property to project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed.

4.4.4.1 Work Performed

The Renco Associates property was not discussed as a property of concern during the Level I Investigation (District, 1996). A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. Large quantities of hazardous materials were noted secured in a placarded enclosure adjacent to the building exterior between stations 12+000 to 12+030. To evaluate potential impacts due to the observed presence of hazardous materials, Kleinfelder advanced one soil boring, SB11+900E on the property on September 15, 1999. A second boring SEB12+024E was not completed as permission to enter the property was not granted. Boring SB11+900E was completed at a depth of 21feet bgs using a direct-push drill rig.

Soil encountered in the boring consisted mainly of clay. A thin silty sand layer was encountered between 2.0 to 3.5 feet bgs. Clayey sand was encountered between 15 to 19.5 feet bgs. The borings logs are presented in Appendix A.

Soil samples were collected in each of the borings at the approximate depths described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, VOCs, semi-volatile organic compounds SVOCs, pesticides, TPHg, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals, VOCs, SVOCs, TPHg, and TPHd;
- 4.5 to 4.6 m (14.5 to 15.0 feet) – Title 22 metals, VOCs, SVOCs, TPHg, and TPHd; and

- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals, VOCs, SVOCs, TPHg, and TPHd;

A reconnaissance groundwater sample was collected from the boring and submitted for analysis for TPHg, TPHd, VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses also was collected from the boring and placed on hold pending soil analytical results.

4.4.4.2 Analytical Results

The following summarizes the analytical results for six soil samples and one groundwater sample collected from the Renco Associates property. The analytical results are presented in Tables 4.4.4.a to 4.4.4.e. and are summarized in the following sections.

4.4.4.2.1 Soil

Metals

Analytical results for six soil samples are presented in Table 4.4.4.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded for any metals. Some arsenic, lead, and mercury concentrations exceeded ten times the STLCs.

Arsenic and lead were detected in all samples with concentrations ranging from 2.5 to 83 mg/kg and 4.3 to 120 mg/kg, respectively. The arsenic concentration (83 mg/kg) and the lead concentration (120 mg/kg) detected in sample SB11+900E-1 exceeded ten times the STLCs. Chromium was detected in all samples with concentrations ranging from 25 to 56 mg/kg. Mercury was detected in all samples with concentrations ranging from 0.097 to 12 mg/kg. The mercury concentrations detected in samples SB11+900E-1 (12 mg/kg), SB11+900E-2.5 (9 mg/kg), and SB11+900E-4 (4.4 mg/kg) exceeded ten times the STLC. Sample SB11+900E-1 was analyzed for soluble lead and soluble mercury; neither soluble metal was detected above the reporting limits.

Barium was detected in all samples with concentrations ranging from 45 to 130 mg/kg. Beryllium was detected in three samples (0.5 to 0.55 mg/kg). Cobalt and copper were detected in all samples with concentrations ranging from 5.8 to 12 mg/kg and 19 to 150 mg/kg, respectively. Nickel (36 to 110 mg/kg), vanadium (26 to 33 mg/kg) and zinc (36 to 71 mg/kg) were detected in all samples.

Pesticides

Analytical results for three soil samples are presented in Table 4.4.4.b. Dieldrin (0.012 mg/kg), 4,4-DDT (0.065 mg/kg), 4,4-DDE (0.1 mg/kg) and 4,4-DDD (0.025 mg/kg) were detected in sample SB11+900E-1. All concentration values reported are below the TTLC concentrations for those compounds.

Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.4.4.c. No VOCs were reported in any of the samples analyzed from the property.

Semi-Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.4.4.d. Benzo(a)pyrene was detected at 0.049 mg/kg in the 1.0 foot sample from boring SB11+900E. No other SVOCs were detected above the reporting limits.

Petroleum Hydrocarbons

Analytical results for six soil samples are presented in Table 4.4.4.e. TPHd was detected in five samples from boring SB11+900E at depths of 1.0, 2.5, 4.0, 14.0 and 19.0 feet (11 mg/kg, 40 mg/kg, 1.1 mg/kg, 1.6 mg/kg, and 2.2 mg/kg, respectively). TPHg was not detected above the reporting limits.

4.4.4.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs in the boring. Pesticides, VOCs, SVOCs and petroleum hydrocarbons were not detected in the groundwater sample analyzed from boring SB11+900E-W. Barium, cobalt, molybdenum, and nickel were detected below General NPDES Permit discharge limits.

4.4.4.3 Discussion

4.4.4.3.1 Extent of Soil Contamination

The analytical data indicated that the extent of soil contamination is minor. Metal concentrations did not exceed their respective TTLCs in boring SB11+900E on the Renco Associates Property. Arsenic, lead, and mercury exceeded ten times the STLC, but based on the soluble mercury, arsenic, and lead data from boring SB11+900E and other parts of the river alignment collected during this investigation, it appears that none of the arsenic, lead, or mercury are soluble.

The pesticides 4,4-DDT (0.065 mg/kg), 4,4-DDE (0.1 mg/kg), and 4,4-DDD (0.025 mg/kg) were reported below their combined TTLC (1.0 mg/kg) at 1.0 foot bgs in boring SB11+900E.

TPHd was detected in samples at depths of 1.0, 2.5, 4.0, 14.0, and 19.0 feet in concentrations of 11 mg/kg, 40 mg/kg, 1.1 mg/kg, 1.6 mg/kg, and 2.2 mg/kg, respectively. No regulatory limit exists for TPHd in soil but analysis of VOCs associated with TPHd, that are under regulatory guidance, revealed no constituents above the regulatory limits.

4.4.4.3.2 Extent of Groundwater Contamination

No pesticides, petroleum hydrocarbons, VOCs or SVOCs were reported above laboratory reporting limits in samples analyzed from the Renco Associates Property. Barium, cobalt, molybdenum, and nickel were reported in the groundwater sample from the property, but none of the concentrations were above the MCL or General NPDES Permit discharge concentration levels.

4.4.4.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that there will be no impacts related to the Renco Associates property on Project construction. If this property was to be excavated, it is likely that it would not require special handling and excavated soil could be disposed at a landfill or reused for construction.

4.4.4.4 Feasibility Study Results

Due to the apparent limited impacts to soil by metals and petroleum hydrocarbons, Kleinfelder will not perform a feasibility study for soil management for this property.

4.4.4.5 Conclusions

Based on the data (from one borehole) obtained during this property investigation, no significant environmental impacts to the Project construction were found. The soil is not classified as a hazardous waste and does not require special handling.

4.4.4.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property at this time.

4.4.5 Station No. 12+060E to 12+120E – Realtec Prop II LP (APN 97-12-127)

The Realtec Prop II LP property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.5). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed.

4.4.5.1 Work Performed

The Realtec Prop II LP property was not discussed as a property of concern during the Level I Investigation (District, 1996). No issues of concern were identified during the property reconnaissance conducted on September 15, 1999; however, the property was probably used previously for agricultural purposes. To assess the potential for impacts due to agricultural use, a single boring (SB12+100E) was hand augered to a depth of 1.6 m (5 feet) bgs on the property on September 23, 1999. Soil encountered in the boring consisted of interbedded sands and clays with root structures. The boring log is presented in Appendix A. Soil samples were collected in at the approximate depths described below:

- 0.2 to 0.3 m (1.5 to 2.0 feet) – Title 22 metals;
- 0.8 to 0.9 m (2.5 to 3.0 feet) –, pesticides, TPHg, and TPHd; and
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd.

4.4.5.2 Analytical Results

The following sections summarize the analytical results for three soil samples collected from boring SB12+100E.

4.4.5.2.1 Soil

Metals

Analytical results for sample SB12+100E-4.5 are presented in Table 4.4.5.a. Metals concentrations in the one soil sample were compared to their respective TTLCs and STLCs.

Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

The metals detected in sample SB12+100E-4.5 are arsenic (4.9 mg/kg), barium (140 mg/kg), chromium (51 mg/kg), cobalt (11 mg/kg), copper (25 mg/kg), lead (6.1 mg/kg), mercury (10 mg/kg), nickel (80 mg/kg), vanadium (34 mg/kg), and zinc (50 mg/kg). TTLCs were not exceeded for any metals. The mercury concentrations exceeded ten times the STLC. Soluble metal analyses (WETs) were not performed for soil samples from this property.

Pesticides

Analytical results for samples SB12+100E-2.5 and SB12+100E-4.5 are presented in Table 4.4.5.b. 4,4-DDD (0.011 mg/kg), 4,4-DDE (0.027 mg/kg), 4,4-DDT (0.017 mg/kg), delta-BHC (0.0022 mg/kg) and dieldrin (0.024 mg/kg) were detected in sample SB12+100E-2.5 at concentrations below the TTLCs and ten times the STLC.

Volatile Organic Compounds

Analytical results for sample SB12+100E-1 and SB12+100E-4.5 are presented in Table 4.4.5.c. VOCs were not detected above reporting limits in either sample.

Semi-Volatile Organic Compounds

Analytical results for sample SB12+100E-1 and SB12+100E-4.5 are presented in Table 4.4.5.d. SVOCs were not detected above reporting limits in either sample.

Petroleum Hydrocarbons

Analytical results for sample SB12+100E-2.5 and SB12+100E-4.5 are presented in Table 4.4.5.e. TPHd was detected in samples SB12+100E-2.5 (3.5 mg/kg) and SB12+100E-4.5 (24 mg/kg). TPHg was not detected above reporting limits.

4.4.5.3 Discussion

4.4.5.3.1 Extent of Soil Contamination

Based on the samples analyzed, the extent of soil contamination appears to be minor. Mercury (10 mg/kg) were detected at concentrations that exceeded ten times the STLCs in sample SB12+100E-4.5. Based on soluble analysis of samples collected elsewhere along the alignment during this investigation, mercury is not believed to be soluble.

4,4-DDD (0.011 mg/kg), 4,4-DDE (0.027 mg/kg), 4,4-DDT (0.017 mg/kg), delta-BHC (0.0022 mg/kg) and dieldrin (0.024 mg/kg) were detected in sample SB12+100E-2.5 at concentrations below regulatory thresholds. The pesticides are likely from the historic use of the property for agriculture. Because of the uneven application of pesticides during agricultural usage, pesticides most likely occur at varying but relatively low concentrations in shallow soil across the property.

4.4.5.3.2 Impacts to Construction

Based on the information obtained from this investigation, it appears that there will likely be no impacts on Project construction. If this property was to be excavated, it is likely that it would not require special handling and excavated soil could be disposed at a landfill or reused for construction.

4.4.5.4 Feasibility Study Results

Due to the apparent limited impacts to soil by pesticides and metals, Kleinfelder will not perform a feasibility study for soil management for this property.

4.4.5.5 Conclusions

Based on the data obtained during this property investigation, no significant environmental impacts were found. The soil is not classified as a hazardous waste and does not require special handling.

4.4.5.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property at this time.

4.4.6 Station No. 12+120E to 12+240E – Gibson G.D. Jr. and Kay Metals (APN 97-12-128)

The Gibson G.D. Jr. and Kay Metals property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.6). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed. Additional investigation work was performed to follow up on information derived during Phase I sampling at this site.

4.4.6.1 Work Performed

The Gibson G.D. Jr. and Kay Metals property was not discussed as a property of concern during the Level I Investigation (District, 1996). A reconnaissance was performed during the river reconnaissance on May 3 to 5, 1999. Hazardous materials placards were noted on the side of the building located between stations 12+125 to 12+200. No hazardous materials storage area was observed outside the building. To assess the potential for impacts due to the presence of the hazardous materials, Kleinfelder advanced two soil borings, SEB12+140E and SB12+190E, on the property on September 22, 1999. The borings were completed at a depth of 5.6 m (17 feet) bgs using direct-push drill rig.

Soil encountered in the borings consisted mainly of clay. Both borings encountered a silty/clayey sand at approximately 4.1 m (12.5 feet). Boring SB12+140E encountered a silty sand from 1.1 to 2.3 m (3.5 to 7 feet) bgs. The boring logs are presented in Appendix A.

Soil samples were collected in each of the borings at the approximate depths described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals and pesticides;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals; and
- 4.4 to 4.6 m (14.5 to 15.0 feet) –VOCs, SVOCs, TPHg, and TPHd.

A reconnaissance groundwater sample also was collected from each boring and submitted for analysis for TPHg, TPHd, VOCs and SVOCs.

On September 29, 2000, Kleinfelder advanced two additional borings on the property of Gibson G.D. Jr. and Kay Metals (APN 97-12-128). These borings were completed to confirm and assess chemicals found in boring SB12+190E. SB12+185E and SB12+195E were completed on September 29, 2000 by hand auger to a depth of 3 feet bgs. The boring logs are presented in Appendix A. Soil Samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – total and soluble mercury and lead, total and soluble pesticides; and
- 0.8 to 0.9 m (2.5 to 3.0 feet) – total and soluble mercury and lead, total and soluble pesticides.

4.4.6.2 Analytical Results

The following summarizes the analytical results for 14 soil samples and two groundwater samples collected from the borings drilled on the Gibson G.D. Jr. and Kay Metals property.

4.4.6.2.1 Soil

Metals

Analytical results for 10 soil samples are presented in Table 4.4.6.a. Six samples were analyzed for the full suite of metals and four samples were analyzed for lead and mercury only. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded for any metals. Some lead, and mercury concentrations exceeded ten times the STLCs and two soluble lead concentrations exceeded the STLC.

Chromium and lead were detected in all samples that were analyzed for these metals, with concentrations ranging from 41 to 91 mg/kg and 3.3 to 140 mg/kg, respectively. Lead concentrations exceeded ten times the STLC in samples collected from borings SB12+185E (130 mg/kg at both 1 foot and 3 feet) and SB12+190E (57 mg/kg at 1 foot and 140 mg/kg at 1 foot). Soluble lead was detected in samples SB12+185E-1 (7.5 mg/L) and SB12+195E-1 (8.9 mg/L) at levels that exceeded the STLC (5 mg/L).

Mercury was detected in all samples with concentrations ranging from 0.05 to 14 mg/kg. The mercury concentrations detected in seven samples exceeded ten times the STLC. Soluble mercury was not detected above the reporting limits.

Arsenic and barium were detected in all samples with concentrations ranging from 1.1 to 22 mg/kg and 110 to 220 mg/kg, respectively. Beryllium was detected in two samples (both 0.56 mg/kg). Cobalt and copper were detected in all samples with concentrations ranging from 5.2 to 16 mg/kg and 15 to 38 mg/kg, respectively. Nickel (47 to 170 mg/kg), vanadium (27 to 40 mg/kg) and zinc (27 to 48 mg/kg) were detected in all samples.

Pesticides and PCBs

Analytical results for 10 soil samples are presented in Table 4.4.6.b. Dieldrin was detected in samples SB12+185E-1 (0.23 mg/kg), SB12+190E-1 (0.26 mg/kg), and SB12+195E-1 (0.25 mg/kg). 4,4-Methoxychlor was detected in sample SB12+140E-2.5 (0.013 mg/kg). 4,4-DDD was detected in four samples (0.011 to 0.67 mg/kg) and 4,4-DDE was detected in four samples (0.0021 to 1.1 mg/kg). 4,4-DDT was detected in four samples (0.02 to 1 mg/kg). The combined concentrations of 4,4-DDT and its breakdown products range from 0.0021 to 2.65 mg/kg. These combined concentrations exceeded the TTLC in samples SB12+185E-1 (2.42 mg/kg), SB12+190E-1 (2.65 mg/kg), and SB12+195E-1 (2.65 mg/kg). Four samples (SB12+185-1. SB12+185E-3, SB12+195E-1, and SB12+195E-3) were analyzed for PCBs, and none were detected above the reporting limits.

Volatile Organic Compounds

Analytical results for six soil samples from borings SEB12+140E and SB12+190E are presented in Table 4.4.6.c. No VOCs were detected in sample SEB12+140E. Methylene chloride was detected in sample SB12+190E-4.5 (0.0053 mg/kg).

Semi-Volatile Organic Compounds

Analytical results for six soil samples from borings SEB12+140E and SB12+190E are presented in Table 4.4.6.d. Phenol was detected in samples SB12+140E-4 (0.23 mg/kg), SB12+140E-14.5 (0.018 mg/kg), SB12+190E-4.5 (0.19 mg/kg), and SB12+190E-14 (0.29 mg/kg). Benzo(a)pyrene was detected in samples SEB12+140E-1 (0.029 mg/kg) and SB12+190E-1 (0.04 mg/kg). The detected concentrations were below regulatory limits.

Petroleum Hydrocarbons

Analytical results for six soil samples are presented in Table 4.4.6.e. TPHd was detected in four shallow samples (1 to 4.5 feet deep) ranging in concentrations from 3.5 to 18 mg/kg. TPHg was not detected above reporting limits.

4.4.6.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs in each boring. Two samples, SEB12+140E-W and SB12+190E-W were analyzed for VOCs, SVOCs, and TPH. VOCs, SVOCs, and TPHg were not detected in either groundwater sample. TPHd was detected in the sample collected from boring SEB12+140E (0.180 mg/L) which exceeds the General NPDES Permit discharge limits.

4.4.6.3 Discussion

4.4.6.3.1 Extent of Soil Contamination

The analytical data indicated that the metals concentrations did not exceed the respective TTLCs in the samples from the Gibson G.D. Jr. and Kay Metals Property. Chromium exceeded ten times the STLC in samples collected from borings SEB12+140E (91 mg/kg at 1 foot) and

SB12+190E (64 mg/kg at 1 foot, 61 mg/kg at 4.5 feet, and 53 mg/kg at 9 feet). Lead exceeded ten times the STLC in samples collected from borings SB12+185E (130 at both 1 and 3 feet), SB12+190E (57 mg/kg at 1 foot), and SB12 +195E (140 mg/kg). Soluble lead concentrations exceeded STLC in samples SB12+185E (7.5 mg/L) and SB12+195E-1 (8.9 mg/L). Mercury exceeded ten times the STLC in seven soil samples. Soluble mercury was not detected above the reporting limits.

The pesticide 4,4-DDE was reported below the TTLC and ten times the STLC at 1.0 foot (0.0021 mg/kg) bgs in boring SB12+140E. 4,4-DDD (0.670 mg/kg), 4,4-DDE (0.980 mg/kg) and 4,4-DDT (1.0 mg/kg) exceeded their TTLC in the 1 foot sample from boring SB12+190E. The combined concentrations of 4,4-DDT and its breakdown products exceeded the TTLC in samples SB12+185E-1 (2.42 mg/kg), SB12+190E-1 (2.65 mg/kg), and SB12+195E-1 (2.65 mg/kg). PCBs were not detected above reporting limits in the four samples for which the analyses were performed. Due to the uneven application of pesticides during past agricultural use, these pesticides may be expected to occur sporadically across the property.

4.4.6.3.2 Extent of Groundwater Contamination

No VOCs or SVOCs were detected above laboratory reporting limits in the samples collected from the Gibson G.D. Jr. and Kay Metals Property. TPHd was detected in the groundwater sample collected from boring SB12+140E at 0.18 mg/L, which exceeds the General NPDES Permit discharge criteria. No regulatory limit exists for TPHd in groundwater.

4.4.6.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that soluble lead and pesticides occur in the soil underlying Gibson G.D. Jr. and Kay Metals Property at concentrations exceeding the regulatory threshold limits. If this property was acquired and excavated, shallow soils would need to be handled as hazardous and require disposal at a Class I (hazardous) facility. Groundwater, if encountered during excavation and pumped from excavations, will require testing and treatment prior to discharge.

4.4.6.4 Feasibility Study Results

Since the District does not plan to acquire a portion of this property no feasibility study is required. Feasibility study information for groundwater management related to the levee embankments is included with the Embankment Area (contained in Section 4.2.4).

4.4.6.5 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are environmental impacts on the property. These impacts are related to the presence of pesticides at concentrations exceeding the TTLC, soluble lead in concentrations exceeding the STLC, and diesel in groundwater. As the District does not plan to acquire the property the soil impacts may not impact the project. As TPHd was found in groundwater in excess of General NPDES discharge limits, the groundwater may require testing and treatment prior to discharge under permit if it is encountered in project excavations.

4.4.6.6 Recommendations

As the District does not plan to acquire the property no further investigation is recommended. However, if the District does acquire the property additional investigation would be warranted to further define the limits of impacted soils. If excavations are made beneath the existing levee the District should test groundwater if encountered, and treat and discharge the water under permit. The District may consider construction in summer and fall months to reduce the possibility of encountering impacted groundwater in excavations. Any excavation of the soils in the area should follow guidance in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.4.7 Station No. 12+720E to 13+140E – Kaiser Aerospace and Electronics (APN 97-58-001)

The Kaiser Aerospace and Electronics property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.7). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed on the property after Phase I sampling.

4.4.7.1 Work Performed

The Kaiser Aerospace and Electronics property was not discussed as a property of concern during the Level I Investigation (District, 1996). A reconnaissance was on May 3 to 5, 1999. No additional issues of concern were observed although the site was occupied to be a high-tech manufacturing facility and it was probably used in the past for agricultural purposes.

To assess potential impacts due to its past use for agriculture and its present use as a manufacturing facility, Kleinfelder advanced two soil borings, SB12+748E and SB12+990E, on the property on September 21, 1999. The samples were inadvertently labeled SB12+748W and SB12+990W on the COC forms. The borings were completed at a depth of 7.0 m (21 feet) and 5.0 m (15 feet) bgs, respectively using a direct-push drill rig.

Soil encountered in the boring SB12+748E consisted of interbedded sand and clay. The soil in boring SB12+990E revealed clay to 3.0 m (10 feet) bgs underlain by silty sand. The boring logs are presented in Appendix A.

Soil samples were collected in each of the borings at the approximate depths described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides TPHg, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – pesticides, TPHg, and TPHd;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals, TPHg, and TPHd;

- 4.4 to 4.6 m (14.5 to 15.0 feet) –VOCs, SVOCs, TPHg, and TPH; and
- 6.3 to 6.5 m (19.0 to 19.5 feet) - Title 22 metals, TPHg, and TPHd.

A groundwater sample also was collected from each boring and submitted for analysis for TPHg, TPHd, VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses was also collected from the boring and placed on hold.

4.4.7.2 Analytical Results

The following sections summarize the analytical results for 11 soil samples (six from SB12+748E, and five from SB12+990E), and two groundwater samples collected from the borings drilled on the Kaiser Aerospace and Electronics property.

4.4.7.2.1 Soil

Metals

Analytical results for 11 soil samples are presented in Table 4.4.7.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded for any metals.

Chromium was detected in all samples and mercury was detected in six samples with concentrations ranging from 24 to 68 mg/kg and 0.051 to 8.7 mg/kg, respectively. Mercury concentrations exceeded ten times the STLC in samples SB12+748E-1 (8.7 mg/kg) and SB12+748E-4.5 (7.4 mg/kg). The mercury concentration in the sample collected from the next depth (SB12+748E-9) was 0.094 mg/kg, which is below the STLC. WET analyses for mercury performed elsewhere in this investigation suggests that mercury is sparingly soluble in this area.

Arsenic was detected in six samples and barium was detected in all samples with concentrations ranging from 2.2 to 14 mg/kg and 45 to 170 mg/kg, respectively. Beryllium was detected in one sample (0.6 mg/kg). Cobalt and copper were detected in all samples with concentrations ranging from 5.1 to 13 mg/kg and 13 to 31 mg/kg, respectively. Lead was detected in all samples (2.7 to 23 mg/kg). Nickel (36 to 110 mg/kg), vanadium (23 to 37 mg/kg) and zinc (29 to 55 mg/kg) were detected in all samples.

Pesticides

Analytical results for six soil samples are presented in Table 4.4.7.b. The pesticides 4,4-DDD (0.055 mg/kg), 4,4-DDE (0.130 mg/kg) and 4,4-DDT (0.078 mg/kg) were detected in the 1 foot sample from boring SB12+748E. The combined concentration of these three compounds did not exceed the TTLC. No other pesticides were reported in the samples.

Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.4.7.c. VOCs were not detected above reporting limits in the soil samples from either boring.

Semi-Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.4.7.d. Benzo(a)pyrene was detected in samples SB12+748E-1 (0.031 mg/kg) and SB12+748E-4.5 (0.030 mg/kg). Phenol was detected in samples SB12+748E-4.5 (0.39 mg/kg), SB12+748E-14.5 (0.40 mg/kg), and SB12+748E-1 (0.15 mg/kg).

Petroleum Hydrocarbons

Analytical results for 11 soil samples are presented in Table 4.4.7.e. TPHd was detected in each soil sample collected in boring SB12+990E at concentrations ranging from 1.4 to 10 mg/kg. TPHg was not detected in samples collected from either boring. These values are considered to be low and do not pose a significant health risk.

4.4.7.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs each of the borings. Samples collected from borings SB12+748E and SB12+990E were analyzed for metals, pesticides, VOCs, SVOCs, and TPH. Pesticides, VOCs, SVOCs, TPHd, and TPHg were not detected above reporting limits in either of the groundwater samples. Metals were below General NPDES permit discharge limits.

4.4.7.3 Discussion

4.4.7.3.1 Extent of Soil Contamination

Mercury concentrations exceeded ten times STLCs in samples SB12+748E-1 (68 mg/kg and 8.7 mg/kg, respectively) and SB12+748E-4.5 (68 mg/kg and 7.4 mg/kg, respectively). Soluble metal analyses (WETs) were not performed for soil samples from this property. However, elsewhere in this investigation, out of 101 WETs for mercury at similar concentrations elsewhere in this investigation, 9 samples were found to contain soluble mercury, and no samples were found to contain mercury in excess of the STLC. Consequently, it is believed that WETs performed on samples at this site would not yield soluble concentrations of mercury in excess of STLCs.

The pesticides 4,4-DDD, 4,4-DDE and 4,4-DDT (0.055, 0.13 and 0.078 mg/kg, respectively) were detected in the 1 foot soil sample from boring SB12+748E below the TTLC. The source of these pesticides is likely the historical use of the property for agriculture. Because of the uneven application of pesticides, it may be expected that the pesticides may be present sporadically across the property at shallow depths.

4.4.7.3.2 Extent of Groundwater Contamination

Groundwater does not appear to have been impacted beneath the property. The only constituents reported in the groundwater samples were the three metals: barium (0.032 mg/L), molybdenum (0.012 mg/L) and nickel (0.0082 mg/L). The metals concentrations are below General NPDES discharge limits.

4.4.7.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that there will be no impacts to Project construction related to this property. If this property was to be acquired and excavated, it is likely that soil would not require special handling and excavated soil could be reused for construction.

4.4.7.4 Feasibility Study Results

Due to the apparent lack of impact and because the District has no plans to acquire the property, a feasibility study for soil or groundwater management for this property is not necessary.

4.4.7.5 Conclusions

Based on the data obtained during this property investigation, it is likely that there will be no significant environmental impacts to the Project construction. The soil will not likely be classified as a hazardous waste and does not require special handling.

4.4.7.6 Recommendations

Kleinfelder does not recommend any further investigation on this property.

4.4.8 Station No. 13+140E to 13+410E – Altos Computer Systems (APN 97-58-003)

The Altos Computer Systems property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.8). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed after Phase I sampling on this site.

4.4.8.1 Work Performed

The Altos Computer Systems property was not discussed as a property of concern during the Level I Investigation (District, 1996). A project-wide reconnaissance was performed on May 3 to 5, 1999, and a property-specific reconnaissance was performed on September 9, 1999. Acer Computer currently occupies the property. No outdoor activities were noted and no additional issues of concern were identified; however, the property was possibly used for agricultural purposes in the past and it is adjacent to Hewlett-Packard. Hewlett-Packard has had documented releases of hazardous materials on its property.

To assess the potential impacts due to past use for agriculture and due to the proximity to Hewlett-Packard, Kleinfelder advanced three soil borings, SB13+150E, SB13+215E, and SB13+303E, on the property on September 16 and 21, 1999. Borings SB13+150E and SB13+215E were completed to a depth of 7.0m (21 feet) and boring SB13+303E was completed to a depth of 5.3 m (16 feet) bgs using a direct-push drill rig.

Soil encountered in the borings consisted primarily of clay and sandy clay. A silty sand with gravel was encountered in the bottom of boring SB13+303E at approximately 5.0 m (15 feet) bgs. The boring logs are presented in Appendix A. Soil samples were collected in each of the borings. Based on the lack of identified concerns during the property reconnaissance, the soil samples were put on hold pending results of the water samples.

A reconnaissance groundwater sample also was collected from each boring and submitted for analysis for TPHg, TPHd, VOCs, and SVOCs. The groundwater was analyzed due to the proximity of the property to Hewlett Packard. A groundwater sample for Title 22 metals and pesticide analyses were also collected from the boring and placed on hold.

4.4.8.2 Analytical Results

The following sections summarize the results of analyses three groundwater samples collected from the borings drilled on the Altos Computer Systems property.

4.4.8.2.1 Soil

No soil samples were analyzed from this property due to the absence of contaminants found in groundwater (discussed below).

4.4.8.2.2 Groundwater

Groundwater was encountered at depths of 9, 10.5 and 14 feet bgs in borings SB13+150E, SB13+215E and SB13+303E, respectively. Barium, molybdenum, nickel, and selenium were detected below General NPDES Permit discharge limits and MCLs. Pesticides, VOCs, SVOCs, and TPHg were not detected above reporting limits. TPHd was reported in groundwater samples from borings SB13+150E (0.240 mg/L) and SEB13+303E (0.120 mg/L) which exceeds General NPDEs Permit discharge limits.

4.4.8.3 Discussion

4.4.8.3.1 Extent of Soil Contamination

No soil samples were analyzed from this property.

4.4.8.3.2 Extent of Groundwater Contamination

No pesticides, VOCs or SVOCs were detected above laboratory reporting limits in groundwater beneath the Altos Computer Property. TPHd detected in the groundwater samples in borings SB13+150E (0.240 mg/L) and SEB13+303E (0.120 mg/L). The TPHd concentrations exceed the General NPDES Permit discharge limit for TPH (0.050 mg/L).

4.4.8.3.3 Impacts to Construction

As the District does not plan to acquire the property no impacts to the project related to soils are anticipated.

Groundwater contains of TPHd at concentrations in excess of General NPDES permit discharge limit. If project construction involves excavation at the levees to the water table additional testing and treatment may be required prior to discharge. However, depths to groundwater ranged from 9 to 14 feet bgs, and consequently dewatering may not be required.

4.4.8.4 Feasibility Study Results

As the District will not require the property a feasibility study is not required. Feasibility study information is presented with the Embankment Area (Section 4.2.4) for groundwater treatment and disposal.

4.4.8.5 Conclusions

As the District does not plan to acquire the property and based on the data obtained during this property investigation, it is believed that there will be no significant environmental impacts to the Project construction. The soil is not classified as a hazardous waste and does not require special handling. Potentially impacted groundwater (TPHd) likely occurs below a level to planned excavation during levee raising construction.

4.4.8.6 Recommendations

As the District does not plan to acquire the property Kleinfelder does not recommend any additional investigation for this property. If the District excavations and encounters groundwater in the levee area as part of the Project, the groundwater should be tested and treated, as appropriate, prior to discharge. The District may consider construction in the vicinity of the levee in the summer and fall months to reduce the possibility of encountering impacted groundwater. Excavation and groundwater extraction, treatment and discharge if planned should be carried out following guidance from a Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.4.9 Station No. 13+550W to 13+605W – Hurlbut Family Trust (APN 97-38-014)

The Hurlbut Family Trust property is located adjacent to the west bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.9). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed. Additional work was performed after Phase I sampling to delineate mercury and pesticides found in the soil.

4.4.9.1 Work Performed

The Hurlbut Family Trust property was not identified as a property of concern during the Level I Investigation (District, 1996). Kleinfelder's regulatory review update indicated the presence of a leaking UST on the site, and historic adjacent property use was automotive repairing and painting. It is probable that the property was also used in the past for agricultural purposes. A reconnaissance was performed on September 17, 1999. The property was occupied by a building that was being used for receiving and a large parking area.

To assess the potential impacts of past agricultural use, a leaking underground storage tank (UST), and the proximity of automotive repair and painting operations, Kleinfelder drilled one soil boring, SB13+580W on the property on September 22, 1999. The boring was completed at a depth of 7.0 m (21 feet) below grade by a direct-push drill rig.

Soil encountered in boring SB13+580W, SB13+575W, and SB13+580W consisted of clay and sandy clay. The clays are underlain by sand at 5.6 m (17 feet) bgs. The boring log is presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.3 to 0.4 m (1.0 to 1.5 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Pesticides;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, VOCs, SVOCs, pesticides, TPHg, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals,;

- 4.3 to 4.4 m (14.0 to 14.5 feet) –VOCs, SVOCs, TPHg, and TPHd; and
- 6.3 to 6.5 m (19.0 to 19.5 feet) - Title 22 metals.

A reconnaissance groundwater sample also was collected and submitted for analysis for TPHg, TPHd, VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses was also collected from the boring and placed on hold pending soil analytical results.

On September 29, 2000, Kleinfelder drilled two additional borings on the property as a follow up measure to investigate SB13+580W. SB13+575W and SB13+585W were drilled to a depth of 3 feet bgs using a hand auger and a slide hammer. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.3 to 0.4 m (1.0 to 1.5 feet) – total and soluble mercury, total and soluble DDD, DDT, DDE;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – total and soluble mercury, total and soluble DDD, DDT, DDE.

4.4.9.2 Analytical Results

The following sections summarize the analytical results of 10 soil samples and 1 groundwater sample collected from the borings drilled on the Hurlbut property.

4.4.9.2.1 Soil

Metals

Analytical results for eight soil samples are presented in Table 4.4.9.a. Four samples were analyzed for the full suite of metals, and four samples were analyzed for mercury only. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeded TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded for any metals.

Chromium and mercury were detected with concentrations ranging from 31 to 55 mg/kg and 0.0054 to 16 mg/kg, respectively. Five of the six mercury concentrations exceeded ten times STLC. Four samples were analyzed for soluble mercury, and soluble mercury was not detected above the reporting limits.

Arsenic was detected in three samples and barium was detected in four samples with concentrations ranging from 3.2 to 5.9 mg/kg and 16 to 110 mg/kg, respectively. Cobalt and copper were detected in four samples with concentrations ranging from 6.3 to 9.9 mg/kg and 13 to 26 mg/kg, respectively. Lead was detected in four samples (2.1 to 16 mg/kg). Selenium was detected in one sample (2.3 mg/kg). Nickel (38 to 75 mg/kg), vanadium (25 to 36 mg/kg), and zinc (26 to 55 mg/kg) were detected in four samples.

Pesticides

Analytical results for seven soil samples are presented in Table 4.4.9.b. Dieldrin was detected in sample SB13+575W-1 (0.011 mg/kg). 4,4-DDD was detected in two samples (0.013 and 0.16 mg/kg), and 4,4-DDE was detected in six samples (0.0041 to 1.5 mg/kg). 4,4-DDT was detected in five samples (0.022 to 1.7 mg/kg). The combined totals of 4,4-DDT and its breakdown products exceeded TTLC in samples SB13+580W-1 (3 mg/kg) and SB13+585W-1 (2.66 mg/kg). Soluble pesticides were not detected above reporting limits in the four samples for which the analyses were performed.

Volatile Organic Compounds

Analytical results for three soil samples collected from boring SB13+580W are presented in Table 4.4.9.c. The only VOC detected was methylene chloride at depths of 1.0 feet (0.0051 mg/kg) and 4.5 feet (0.0051 mg/kg) below grade. Methylene chloride is a standard laboratory agent used in the preparation of samples. There are no laboratory notes indicating that methylene chloride interfered with the sample analysis.

Semi-Volatile Organic Compounds

Analytical results for three soil samples collected from boring SB13+580W are presented in Table 4.4.9.d. Benzo(a)pyrene (0.077 mg/kg), fluoranthene (0.19 mg/kg), naphthalene (0.18

mg/kg), phenanthrene (0.24 mg/kg), and pyrene (0.27 mg/kg) were detected in the soil sample collected at a depth of 1.0 foot bgs. The only other SVOC reported was phenol (0.52 mg/kg) at a depth of 14 feet below grade. The six SVOCs were detected below general RWQCB guidelines of 10 mg/kg for SVOCs.

Petroleum Hydrocarbons

Analytical results for three soil samples collected from boring SB13+580W are presented in Table 4.4.9.d. TPH as diesel was detected at concentrations of 20 and 260 mg/kg at depths of 1.0 and 4.5 feet below grade, respectively. These concentrations are considered to be low and to not pose a significant health risk. TPHg was not detected above reporting limits in any of the soil samples.

4.4.9.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet bgs in boring SB13+580W. Pesticides, VOCs, SVOCs, TPHd, and TPHg were not detected above reporting limits in the groundwater sample.

4.4.9.3 Discussion

4.4.9.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the vicinity of the Hurlbut Property. Mercury exceeded ten times STLCs, but soluble mercury was not detected in the four samples for which it was analyzed.

The combined concentrations of pesticides 4,4-DDE, 4,4-DDD and 4,4-DDT were detected above their TTLC at 1.0 foot below grade in borings SB13+580W and SB13+585W. The concentration of these compounds decreased to less than the reporting limit at a depth of 4.5 feet below grade. Soluble pesticides were not detected in any soil samples.

Methylene chloride, the VOC reported in soil, was present at a low concentration, is a commonly used in laboratories. The reported concentration may due to laboratory error, and not representative of the soil conditions.

The SVOCs reported in the 1.0 foot deep sample were PAHs. These compounds are typically associated with waste oil and heavier petroleum hydrocarbons such as coal tar and asphalt. Phenol and naphthalene also were reported. Naphthalene is typically found in gasoline and diesel. Phenol is usually associated with wood preservative or cleaning products. All SVOCs were detected below general RWQCB guidelines.

TPHd was reported at a concentration of 20 mg/kg at a depth of 1 foot and 260 mg/kg at a depth of 4.5 feet below grade in samples collected from boring SB13+580W-1. The underlying sample at 9.5 feet below grade was not analyzed for TPHd, but it was less than the reporting limit at a depth of 14.5 feet below grade. TPHg was not reported in any of the analyzed samples.

4.4.9.3.2 Extent of Groundwater Contamination

Pesticides, VOCs, SVOCs, TPHd, and TPHg were not detected in the groundwater sample collected from boring SB13+580W.

4.4.9.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that pesticides have impacted the shallow soil at the outboard toe of the levee adjacent to the Hurlbut Property. As borings in this investigation were drilled near the outboard toe any excavation in this area may encounter the pesticides discovered in this investigation. If this area is excavated as part of the Project, this soil may require additional testing, specific handling, and disposal at a Class I or II facility.

4.4.9.4 Feasibility Study Results

Since the District does not plan to acquire a portion of the property no feasibility study is necessary. Feasibility Study information for the Embankment Area is provided in Section 4.2.4.

4.4.9.5 Conclusions

Based on the data obtained during this property investigation, it appears that pesticides have impacted shallow soils at the outboard toe of the levee adjacent to the Hurlbut property. The southern-most extent of impacts was not defined. If excavation is performed in this area as part of the project, these soils will require special handling and disposal as a hazardous waste. Groundwater is not know to be impacted in this area.

4.4.9.6 Recommendations

As the District does not plan to acquire the property no further investigation by the District is recommended. However, since soils impacts were identified at the outboard toe of the levee, if the District plans excavation in this area, the soils should be handled and disposed of as a hazardous waste. Additional investigation to determine the southern limit of the impacted soil could reduce costs if the District excavates in the area. Procedures included in the Soils and Groundwater Management Plan to be prepared by Kleinfelder should be followed with respect to excavations and disposal of soils at the outboard tow if excavation is planned.

4.4.10 Station No. 13+410E to 13+650E – City of San Jose (APN 97-58-004)

The City of San Jose property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.4.10). The District initially planned to acquire a 20 foot portion of the property for project construction. In late year 2000, the design alternative refinement excluded the proposed acquisition of the property. No additional work was performed.

4.4.10.1 Work Performed

The City of San Jose property was not identified as a property of concern during the Level I Investigation (District, 1996). A reconnaissance was performed on September 7, 1999. A large water tank and a small brick structure occupy the property. According to a worker on the property, no hazardous materials were used or stored on the property. No additional issues of concern were revealed. The investigation was performed to assess whether the Hewlett Packard facility, a property with known releases located across the street, had impacted the City property. Kleinfelder advanced two soil borings, SB13+465E and SB13+590E on the property on September 21, 1999. The borings were completed at a depth of 7.0 m (21 feet) and 6.3 m (19 feet) bgs, respectively using direct- push methods.

Soil encountered in the boring SB13+465E consisted of interbedded silty to clayey sand and clay to sandy clay. Boring SB13+590E encountered sandy clay and clay, which is underlain by sand at 4.1 m (12.5 feet) below grade. The boring logs are presented in Appendix A.

A reconnaissance groundwater sample from each boring was collected and submitted for analysis for TPHg, TPHd, VOCs and SVOCs. A groundwater sample for Title 22 metals and pesticide analyses also was collected from each of the borings and placed on hold. Soil samples also were collected in each of the borings. The soil samples were placed on hold pending results of reconnaissance groundwater samples taken from each boring.

4.4.10.2 Analytical Results

The following sections summarize the groundwater analyses results for samples collected from borings SB13+465E and SB13+590E.

4.4.10.2.1 Soil

Due to the limited impacts found in groundwater, no soil samples were submitted for chemical analyses.

4.4.10.2.2 Groundwater

Groundwater was encountered at a depth of 14 feet below grade in borings SB13+465E and SB13+590E. Barium, molybdenum, selenium, and nickel were detected below General NPDES Permit discharge limits in both samples. Pesticides, VOCs, SVOCs, TPHd, and TPHg were not detected above reporting limits either groundwater sample.

4.4.10.3 Discussion

4.4.10.3.1 Extent of Soil Contamination

No soil samples were collected; therefore, nothing is known about environment impact to soil.

4.4.10.3.2 Extent of Groundwater Contamination

Groundwater has not been impacted by any of the analyzed compounds.

4.4.10.3.3 Impacts to Construction

Based on the information obtained from this investigation, it appears that there are no impacts to Project construction near this property. Kleinfelder feels that if soil at this location was to be excavated, it is likely that soil would not require special handling or disposal.

4.4.10.4 Feasibility Study Results

Due to the apparent lack of impact, a feasibility study for soil or groundwater management for this property is not necessary.

4.4.10.5 Conclusions

Based on the data obtained during this property investigation, no significant environmental impacts were observed.

4.4.10.6 Recommendations

Kleinfelder does not recommend any additional investigation for this property at this time.

4.5 Properties Investigated in Phase II Due to Potential Property Acquisition

4.5.1 Station No. 7+820E to 8+015EE – State of California (APN 15-39-014)

The State of California property is located adjacent to the east bank of the Guadalupe River, adjacent to the north of Highway 237 (Plate 4.5.1). The District may or may not acquire a 50 meter wide portion of this property for the construction of a bypass channel.

4.5.1.1 Work Performed

The State of California property was identified as a property of concern during the Level I Investigation (District, 1996) due to the observation of a historical depression on the Property which has since been filled. Kleinfelder did not perform the investigation proposed in the workplan during Phase I on the property due to insufficient time in September, 1999. In order to meet Level II Investigation objectives, Kleinfelder advanced three soil borings, SB7+975E, SB7+990E, and SB8+015E on October 2, 2000. All three borings were drilled to depths of 20 feet bgs using a direct-push drill rig. Borings SB7+975E and SB7+990E were advanced approximately 16 m and 20 m respectively from the top of the levee, on the State of California property. Boring SB8+015E was drilled on the same day underneath the northern span of State Route 237. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 Metals), pesticides, asbestos, VOCs, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) - Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 Metals), pesticides, asbestos, VOCs, and TPHd;
- 1.4 to 1.5 m (4.5 to 5.0 feet) - Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 Metals), pesticides, asbestos, VOCs, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) - Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 Metals), pesticides, asbestos, VOCs, and TPHd;

- 4.4 to 4.6 m (14.5 to 15.0 feet) - Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 Metals), pesticides, asbestos, VOCs, and TPHd; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals, pesticides, asbestos, VOCs, and TPHd (due to excessive moisture, a 20 foot sample could not be collected at SB8+015E).

The 3.0 and 15.0 foot samples were collected, placed on hold and analyzed depending the receipt of results of the overlying or underlying samples from the laboratory. The 3.0 and 15.0 foot samples were analyzed if chemicals detected in the overlying or underlying sample exceeded TTLCs or ten times STLCs.

Reconnaissance groundwater samples were also collected from SB7+900E and SB8+015E and submitted for analyses of Title 22 metals (SB8+015E was analyzed for total and soluble Title 22 metals), pesticides, asbestos, VOCs, and TPHd. A proposed groundwater sample could not be collected from SB7+975E.

4.5.1.2 Analytical Results

The following sections summarize the results of analyses of 14 soil samples and two groundwater samples collected from State of California property APN 15-39-014.Table 4.5.1 presents the location, sample depth and results for each boring. The analytical results are summarized below.

4.5.1.2.1 Soil

Metals

Analytical results for 14 soil samples are presented in Table 4.5.1.a. Eight samples were analyzed for the full suite of metals, one sample was analyzed for mercury only, one sample was analyzed for chromium only, and one sample was analyzed for chromium and mercury. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test

(WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous). TTLCs were not exceeded for any metals. Chromium was detected below the TTLC and ten times its STLC at concentrations ranging from 27 mg/kg to 54 mg/kgs.

Lead was detected below TTLC and above ten times its STLC in six of the 14 samples analyzed at concentrations ranging from 4.2 to 78 mg/kg. Mercury was detected in 13 samples at concentrations ranging 0.1 to 5.6 mg/kg. Three of the 13 samples exceeded ten times its STLC. The highest lead concentration, detected in sample SB8+015E-5 (78 mg/kg), and three mercury detections in samples SB7+975E-1 (2.3 mg/kg), SB7+975E-5 (5.6 mg/kg), and SB8+990E-10 (4.3 mg/kg) exceeded ten times STLC. Three samples collected from boring SB1+105E-1 were analyzed for soluble chromium, soluble lead, and soluble mercury. Soluble chromium and mercury were not detected above reporting limits. Soluble lead was detected below STLC in sample SB8+015E-1 (1.6 mg/L) and SB8+015E-5 (1.8 mg/L).

Arsenic and barium were detected in 11 samples with concentrations ranging from 5.7 to 12 mg/kg and 22 to 290 mg/kg, respectively. Beryllium was detected in six samples (0.51 to 0.56 mg/kg) and cadmium was detected in one sample (3 mg/kg). Cobalt and copper were detected in 11 samples with concentrations ranging from 6.4 to 16 mg/kg and 16 to 43 mg/kg, respectively. Molybdenum was detected in two samples (1.3 and 10 mg/kg), and nickel was detected in 11 samples (42 to 87 mg/kg). Soluble nickel was detected below its STLC, from 1.1 to 1.7 mg/L, in the three samples collected from boring SB8+015E. Vanadium (25 to 43 mg/kg), and zinc (35 to 500 mg/kg) were detected in 11 samples. Soluble vanadium (0.81 to 0.96 mg/L) and soluble zinc (1.6 to 160 mg/L) were detected below STLC in two samples collected from boring SB8+015E.

Pesticides and PCBs

Analytical results for 11 soil samples are presented in Table 4.5.1.b. 4,4-DDD (0.02 mg/kg), 4,4-DDE (0.11 mg/kg), and 4,4-DDT (0.021 mg/kg) were detected in sample SB7+990E-1.

4,4-DDE (0.023 mg/kg) and 4,4-DDT (0.023 mg/kg) were detected in sample SB8+015E-1. 4,4-DDT (0.052 mg/kg) was detected in sample SB8+015E-5. The combined concentrations of

4,4-DDT and its breakdown products range from 0.046 to 0.151 mg/kg. The highest of the combined concentrations (0.151 mg/kg) was detected in sample SB7+990E-1 below the TTLC. No other pesticides or PCBs were detected.

Volatile Organic Compounds

The analytical results for 11 soil samples are presented in Table 4.5.1.c. VOCs were not detected above reporting limits in any of the eleven samples.

Petroleum Hydrocarbons

The results for TPHd analysis for eleven soil samples are presented in Table 4.5.1.e. TPHd was detected in seven samples with concentrations ranging from 1.2 to 9.4 mg/kg. The results were reported by the laboratory that the hydrocarbon detected did not match a typical TPhd pattern. The hydrocarbon may have result from presence of organic matter in the soil.

Asbestos

The analytical results for 11 soil samples are presented in Table 4.5.1.f. Asbestos was not detected in any of the 11 samples.

4.5.1.2.2 Groundwater

Two groundwater samples, collected from borings SB7+990E and SB8+015E, were analyzed for metals, pesticides and PCBs, VOCs, SVOCs, and TPHd. The results are presented in Tables 4.5.1.a to 4.5.1.e.

Metals

Barium was detected in samples SB7+990E-W (0.37 mg/L) and SB8+015E-W (1.2 mg/L); the higher concentration (1.2 mg/L) exceeded the MCL. Cadmium was detected in sample SB7+990E-W (0.0056 mg/L) and thallium was detected in sample SB8+015E-W (0.0051 mg/L), and both concentrations exceeded MCLs. Cobalt, copper, mercury, molybdenum, and zinc were detected below MCLs or General NPDES Permit discharge limits.

Pesticides

Pesticides and PCBs were not detected above reporting limits in either sample.

Volatile Organic Compounds

VOCs were not detected above reporting limits in either sample.

Semi-Volatile Organic Compounds

SVOCs were not detected above reporting limits in either sample.

Petroleum Hydrocarbons

TPHd was detected in sample SB7+990E-W (0.078 mg/L) and SB8+015E-W (1 mg/L). The results were reported by the laboratory that the hydrocarbons detected in the samples did not match the pattern of TPHd standard.

4.5.1.3 Discussion

4.5.1.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the borings drilled on the State of California property. Three samples collected from boring SB1+105E-1 were analyzed for soluble chromium, soluble lead, and soluble mercury. Soluble chromium and mercury were not detected above reporting limits. Soluble lead was detected below STLC in sample SB8+015E-1 (1.6 mg/L) and SB8+015E-5 (1.8 mg/L).

4,4-DDT, 4,4-DDD and 4,4-DDE were detected in SB7+990E-1 and SB8+015E-1. The combined concentrations of 4,4-DDT and its breakdown products were below the TTLC. No other pesticides or PCBs were detected. The probable past use of the property as an agricultural area makes it likely pesticides may be encountered sporadically across the property in shallow soils, and in the previous surface soils now covered by embankment materials.

Low levels of TPHd were detected in seven samples with concentrations ranging from 1.2 to 9.4 mg/kg. The TPHd did not match the diesel standard. VOCs and asbestos were not detected in any soil samples from the property.

4.5.1.3.2 Extent of Groundwater Contamination

Barium (1.2 mg/L) and thallium (0.0051 mg/L) were detected above MCLs in the groundwater sample collected from boring SB8+015E, and cadmium (0.0056 mg/L) was detected above MCL in the groundwater sample collected from boring SB7+990E. Cobalt, copper, mercury, molybdenum, and zinc were detected below MCLs and General NPDES Permit discharge limits.

TPHd was detected in the sample collected from SB7+990E (0.078 mg/L) and the sample collected from SB8+015E (1 mg/L). The TPHd concentrations exceed the General NPDES Permit discharge limit 0.050 mg/L however, the TPHd chromatograph did not match the diesel standard. Pesticides, PCBs, VOCs, and SVOCs were not detected above reporting limits in either sample.

4.5.1.3.3 Impacts to Construction

Based on the information obtained from this investigation, shallow soil on the property contains pesticides however, concentrations are low (below TTLCs). As these concentrations are low no soil impacts to construction are anticipated. Groundwater was found to contain barium, cadmium, and thallium at concentrations in excess of MCLs. Groundwater was also found to contain TPHd in excess of General NPDES Permit discharge limits. However, the TPHd chromatogram did not match the standard suggesting the TPHd may not be diesel but other organic substance. Consequently, the TPHd concentrations may or may not be of concern. Groundwater may require treatment prior to discharge into the river if the property is excavated to groundwater depth.

4.5.1.4 Feasibility Study Results

A feasibility study is not recommended for soil at this property. Feasibility study information for groundwater is included in Section 4.2.4

4.5.1.5 Conclusions

Soil on the property, and beneath embankment materials, has was found to contain low levels of TPHd, pesticides and metals below TTLCs. The concentrations of these constituents are not expected to impact the project. Groundwater was found to contain barium, cadmium, and thallium at concentrations in excess of MCLs. Concentrations of TPHd were detected in groundwater in excess of General NPDES Permit discharge limits. However the TPHd chromatogram did not resemble the diesel standard. If dewatering becomes necessary treatment may be required prior to discharge.

4.5.1.6 Recommendations

If excavation is required as part of the project this work should follow guidelines included in the Soil and Groundwater Management Plan to be prepared by Kleinfelder. The District should consider construction during summer and fall months to reduce the potential need to dewater and the potential need to treat groundwater prior to discharge.

4.5.2 Station No. 8+610E to 8+940E – Levee Adjacent to Renaissance Associates and Gibson – Speno and A-M and Nel Association (APN 97-52-018, 019, 020 and 021)

The levee adjacent to the Renaissance Associates (APN 97-52-018 and APN 97-52-019) and the Gibson –Speno & A-M Nel Associates (APN97-52-020 and APN97-52-021) properties is located on the east bank of the Guadalupe River between State Route 237 and Tasman Drive (Plate 4.5.2). Initially, the District planned to acquire a 20 foot portion of the Renaissance and Gibson-Speno Properties. Right of entry on the properties was issued in late September 1999 but Kleinfelder could not investigate the properties during that month due to insufficient time. In late year 2000, the design alternative refinement excluded the proposed acquisition of the properties. Soil borings were drilled in late year 2000 to investigate the possible existence of potential hazardous material contamination on the District right of way, which may impact the project construction if the inboard embankment is to be excavated for construction of channel modifications.

4.5.2.1 Work Performed

The Renaissance Associates and Gibson-Speno and A-M and Nel Associates properties were not identified as properties of concern during the Level I Investigation (District, 1996). During the river reconnaissance conducted between May 3 and 5, 1999, an apparent pump house was observed between Stations 8+640 and 8+670. Hazardous material placards were noted on the structure. Between September 29, 2000 and October 4, 2000, Kleinfelder advanced four soil borings: SEB8+700E, SEB8+900E,SEB9+000E and SEB9+100E (Plate 4.5.2). SEB8+700E and SEB9+100E were drilled at the top of the inboard levee to a depth of 25 feet bgs; a direct push drill rig was used for SEB8+700E and hollow stem auger rig was used for SEB9+100E. SEB8+900E and SEB9+100E were drilled at the inboard toe of the levee to a depth of 10 feet bgs using a hollow stem auger drill rig. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) Title 22 metals and pesticides;
- 0.8 to 0.9 m (2.5 to 3.0 feet) Title 22 metals and pesticides;
- 1.4 to 1.5 m (4.5 to 5.0 feet) Title 22 metals and pesticides;

- 2.9 to 3.0 m (9.5 to 10.0 feet) Title 22 metals and pesticides;
- 4.4 to 4.6 m (14.5 to 15.0 feet) Title 22 metals and pesticides (for SEB8+700E and SEB9+00E only);
- 5.9 to 6.1 m (19.5 to 20.0 feet) Title 22 metals and pesticides (for SEB8+700E and SEB9+00E only); and
- 7.5 to 7.6 m (24.5 to 25.0 feet) Title 22 metals and pesticides (for SEB8+700E and SEB9+00E only).

For SEB8+700E and SEB9+000E, samples were collected at depths of 3.0 feet and 15.0 feet, placed on hold, and analyzed depending on the results of the overlying or underlying samples. The 3.0 feet and 15.0 feet samples were analyzed if chemicals detected in the overlying or underlying sample exceeded TTLCs or ten times the STLCs.

In addition to Title 22 metals and pesticides analyses, the 15.0 feet sample from SEB8+700E and 30 foot sample from SEB9+100E were also analyzed for mercury parameters, which consist of sulfide, total organic carbon, iron, grain size (sieve and hydrometer analysis), and moisture content. These results will be reported under a separate cover.

4.5.2.2 Analytical Results

The following summarizes the results of analyses of soil samples collected from the levee adjacent to the Renaissance Associates and Gibson-Speno and A-M and Nel Associates properties APN 97-52-018 and APN 97-52-019.

4.5.2.2.1 Soil

Metals

Analytical results for 22 soil samples are presented in Table 4.5.2.a. Eighteen samples were analyzed for the full suite of metals, one sample was analyzed for chromium and mercury only; one sample was analyzed for chromium only, and two samples were analyzed for arsenic, lead and mercury. Metals concentrations in each soil sample were compared to their respective TTLC and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Arsenic and chromium were detected in all samples with concentrations ranging from 4.5 to 91 mg/kg and 26 to 76 mg/kg, respectively. The highest concentrations of arsenic, detected in samples SEB8+700E-20 (70 mg/kg) and SEB9+000E-20 (91 mg/kg), exceeded ten times STLC.

Lead and mercury were detected in all samples with concentrations ranging from 4.6 to 340 mg/kg and 0.079 to 10 mg/kg, respectively. Three of the 20 lead concentrations which were detected in samples SEB8+700E-20 (260 mg/kg), SEB8+900E-10 (150 mg/kg), and SEB9+000E-20 (340 mg/kg), exceeded ten times STLC. Mercury concentrations detected in samples collected from depths of 1, 5, and 20 feet bgs in boring SEB8+700E (2.2 to 6.7 mg/kg) exceeded ten times STLC.

Barium was detected in 18 samples and beryllium was detected in 12 samples with concentrations ranging from 37 to 200 mg/kg and 0.51 to 0.75 mg/kg, respectively. Cobalt and copper were detected in 18 samples with concentrations ranging from 6.8 to 14 mg/kg and 17 to 87 mg/kg, respectively. Nickel (33 to 130 mg/kg), vanadium (28 to 67 mg/kg), and zinc (36 to 72 mg/kg) were detected in nine samples.

Pesticides

Analytical results for ten soil samples are presented in Table 4.5.2.b. 4,4-DDD was detected in eight samples (0.0081 to 2 mg/kg), 4,4-DDE was detected in 11 samples (0.012 to 0.12 mg/kg), and 4,4-DDT was detected in seven samples (0.0021 to 0.26 mg/kg). The combined concentrations of the three pesticides range from 0.0021 to 3.15 mg/kg. The highest of these combined concentrations were detected in sample SEB8+700E-20 and SEB9+000E-20 at 1.22 mg/kg and 3.15 mg/kg, receptively. These concentrations exceeded the TTLC. The amount detected in the samples collected from 15 feet deep in the same borings were significantly less than the TTLC, and no pesticides were detected in the samples collected from 25 feet deep in the same borings.

4.5.2.2.2 Groundwater

Groundwater samples were not collected from borings advanced on this property.

4.5.2.3 Discussion

4.5.2.3.1 Extent of Soil Contamination

The analytical data indicates that metals concentrations did not exceed the respective TTLCs in the borings drilled on the Renaissance Associates and Gibson-Speno and A-M and Nell Associates properties. Arsenic was detected above ten times STLC in sample SEB8+700E-20 (70 mg/kg). Lead was detected above ten times STLC in samples SEB8+700E-20 (260 mg/kg), SEB8+900E-10 (150 mg/kg) and SEB9+000E-20 (340 mg/kg). These values were found at depth (20 feet and 10 feet, respectively) beneath soil with relatively low concentrations. Mercury was detected above ten times STLC in samples SEB8+700E-1 (2.2 mg/kg), SEB8+700E-5 (3.4 mg/kg), and SEB8+700E-1 (6.7 mg/kg).

Soluble metal analyses Waste Extraction Test (WETs) were not performed for soil samples from these properties. However, elsewhere in this investigation, 46 WETs were performed for lead at similar concentrations. In these analyses soluble lead was detected in 24 of the samples and only 3 of the tests produced soluble lead in concentrations in excess of the STLC. Out of 101 WETs for mercury at similar concentrations elsewhere in this investigation, 9 samples were found to contain soluble mercury, and no samples were found to contain mercury in excess of the STLC. Consequently it is not likely that hazardous levels of mercury and lead exist in the borings.

4,4-DDD was detected in eight samples (0.0081 to 2 mg/kg), 4,4-DDE was detected in eleven samples (0.0021 to 1.0 mg/kg), and 4,4-DDT was detected in seven samples (0.0021 to 0.26 mg/kg). The combined concentrations of the three pesticides range from 0.0021 to 3.15 mg/kg. The combined concentrations exceeded the TTLC in SEB8+700E-20 (1.22 mg/kg) and SEB9+000E-20 (3.15 mg/kg). The probable past use of the property as an agricultural area makes it likely that pesticides may be encountered sporadically across the property and beneath the embankment materials at the level of the former surface.

4.5.2.3.2 Extent of Groundwater Contamination

Groundwater samples were not collected from borings adjacent to this property.

4.5.2.3.3 Impacts to Construction

Based on the results from soil sampling and analyses, it appears that if the District plans to acquire the properties or excavates beneath the levees in certain areas, there may be impacts to construction from residual pesticides (4,4-DDT, 4,4-DDD and 4,4-DDE). Because pesticide concentrations exceeded TTLCs, these soils, if excavated, will require special handling, additional testing, and possible disposal at a Class I facility. In addition, preventative measures to protect worker health and safety (training, respiratory protection, dust control, etc.) may be required.

4.5.2.4 Feasibility Study Results

Since the District does not plan to acquire a portion of these a feasibility study is not necessary. A feasibility study for the embankment area is included in Section 4.2.4

4.5.2.5 Conclusions

Pesticides at concentrations above TTLCs are present in surface soils, and possibly, in former surface soils beneath embankment materials. If the District acquires the property and excavates during construction, these materials may require special handling, testing, and disposal. The impacts from groundwater are not known because water samples were not collected or analyzed.

4.5.2.6 Recommendations

Since the District will not acquire a portion of these properties, no further investigation is recommended. If the District excavates the levee area as part of the project that work should be carried out following guidance contained in a Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.5.3 Station No. 8+095E to 8+300E – Sylvia (APN 097-50-001 and 97-50-002)

The Sylvia property is located adjacent to the east bank of the Guadalupe River adjacent to the south of State Route 237 (Plate 4.5.4). The District may acquire a 50 m wide portion of this property for the construction of a bypass channel.

4.5.3.1 Work Performed

The Sylvia property was identified as a potential acquisition for a bypass channel by the District. In order to meet Level II Investigation objectives, Kleinfelder advanced two soil borings, SB8+095E, SB8+115E, on October 3, 2000. Borings SB8+095E and SB+115E were advanced approximately 19 meters and 18 meters respectively to the from the outboard levee top on the Sylvia property. Due to the location of several underground utilities in this area, the top 5.0 feet of borings SB8+095E and SB8+115E were completed by hand auger as a safety measure. Boring SB8+115E was then advanced to a depth of 20 feet bgs using a direct-push rig. Boring SB8+095 was proposed to be drilled to a depth of 20 feet bgs using a direct push drill rig, but refusal was encountered at a depth of 11.5 feet bgs. Due to the uncertain location of underground utilities (sewer and gas lines) it was deemed unsafe by the on-site geologist to move over a couple of feet and try again. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPHd;
- 1.4 to 1.5 m (4.5 to 5.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPHd;
- 2.9 to 3.0 m (9.5 to 10.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPH;
- 4.4 to 4.6 m (14.5 to 15.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPHd. (SB8+115E only); and

- 5.9 to 6.1 m (19.5 to 20.0 feet) - Total and soluble Title 22 Metals, pesticides, asbestos, VOCs, and TPHd. (SB8+115E only).

The 3.0 and 15.0 foot samples were collected, placed on hold and analyzed pending the receipt of results of the overlying or underlying samples from the laboratory. The 3.0 and 15.0 foot samples were analyzed if chemicals detected in the overlying or underlying sample exceeded TTLCs or ten times the STLCs.

The proposed groundwater samples could not be collected from SB8+095E and SB8+115E done to drilling refusal before the water table and no water entering the boreholes.

4.5.3.2 Analytical Results

The following sections summarize the results of analyses of the seven soil samples collected from the Sylvia Property.

4.5.3.2.1 Soil

Metals

Analytical results for seven samples are presented in Table 4.5.4.a. Seven samples were analyzed for total and soluble metals. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Total chromium and lead were detected in all samples with concentrations ranging from 45 to 66 mg/kg and 5.6 to 70 mg/kg, respectively, below the TTLC. Soluble chromium was not detected in any samples. Total lead concentrations exceeded ten times STLC in samples SB8+095E-1 at concentrations of 52 mg/kg, SB8+095E-5 (70 mg/kg), and SB8+115E-5 (58 mg/kg). Soluble lead was detected below STLC in the same samples with concentrations ranging from 1.1 to 1.6 mg/kg. Total mercury exceeded ten times STLC in samples SB8+115E-1 (9.5 mg/kg) and SB8+115e-5 (4.4 mg/kg). Soluble mercury was not detected above reporting limits.

Total arsenic was detected in all samples at concentrations ranging from 5.9 to 14 mg/kg, and soluble arsenic was detected in sample SB8+115E-5 below the STLC (0.54 mg/kg). Total and soluble barium was detected below TTLC and ten times the STLC in all samples with concentrations ranging from 91 to 310 mg/kg and 4.7 to 13 mg/Lg, respectively. Total beryllium was detected in three samples and total cadmium was detected in two samples with concentrations ranging from 0.51 to 0.63 mg/kg and 0.73 to 0.78 mg/kg, respectively. Total cobalt was detected in all samples (10 to 15 mg/kg) and soluble cobalt was detected in three samples (0.51 to 0.56 mg/kg). Total copper was detected in all samples (25 to 51 mg/kg) and soluble copper was detected in four samples (0.94 to 1.2 mg/kg). Total molybdenum was detected in one sample (1.8 mg/kg). Total nickel (65 to 110 mg/kg), total vanadium (28 to 47 mg/kg), and total zinc (48 to 100 mg/kg) were detected in all samples. Soluble nickel was detected in all samples (0.82 to 1.7 mg/L), soluble vanadium was detected in three samples (0.53 to 0.76 mg/L), and soluble zinc was detected in five samples (0.59 to 3.2 mg/L).

Pesticides and PCBs

Analytical results for seven soil samples are presented in Table 4.5.4.b. 4,4-DDD (0.0033 to 0.03 mg/kg), 4,4-DDE (0.0056 to 0.046 mg/kg), and 4,4-DDT (0.0021 to 0.032 mg/kg) were detected below TTLCs in samples SB8+095E-1, SB8+095E-5, SB8+095E-10, and SB8+115E-1. The combined concentrations of the three pesticides ranged from 0.011 to 0.097 mg/kg at concentrations below the TTLC and below ten times the STLC. No other pesticides or PCBs were detected.

Volatile Organic Compounds

Analytical results for seven soil samples are presented in Table 4.5.4.c. VOCs were not detected above reporting limits in any of the seven samples.

Petroleum Hydrocarbons

Analytical results for seven soil samples are presented in Table 4.5.4.d. TPHd, not matching the diesel hydrocarbon pattern, was detected in samples SB8+115E-1 (7.4 mg/kg), SB8+115E-5 (1.2 mg/kg), and SB8+115E-20 (1.2 mg/kg). The result for sample SB8+115E-1 was flagged by the analytical laboratory as being identified as TPHd, although the hydrocarbon does not match the pattern of the laboratory diesel pattern. The other two results were flagged as being in the diesel range, although the compounds do not match the characteristic pattern of a petroleum hydrocarbon. The concentrations measured in these samples are considered low.

Asbestos

Analytical results for seven soil samples are presented in Table 4.5.4.e. Asbestos was not detected in any of the samples.

4.5.3.2.2 Groundwater

Groundwater samples were not collected from the borings on this property.

4.5.3.3 Discussion

4.5.3.3.1 Extent of Soil Contamination

Total lead concentrations exceeded ten times STLC in samples SB8+095E-1 (52 mg/kg), SB8+095E-5 (70 mg/kg), and SB8+115E-5 (58 mg/kg). Total mercury exceeded ten times STLC in samples SB8+115E-1 (9.5 mg/kg) and SB8+115e-5 (4.4 mg/kg). Soluble lead was detected below STLC in the same samples with concentrations ranging from 1.1 to 1.6 mg/L. Soluble chromium and soluble mercury were not detected above reporting limits.

4,4-DDD (0.0033 to 0.03 mg/kg), 4,4-DDE (0.0056 to 0.046 mg/kg), and 4,4-DDT (0.0021 to 0.032 mg/kg) were detected below TTLCs and STLCs in samples SB8+095E-1, SB8+095E-5, SB8+095E-10, and SB8+115E-1. The combined concentrations of the three pesticides range from 0.011 to 0.097 mg/kg, below the TTLC. No other pesticides or PCBs were detected.

TPHd was detected in samples SB8+115E-1 (7.4 mg/kg), SB8+115E-5 (1.2 mg/kg), and SB8+115E-20 (1.2 mg/kg).

4.5.3.3.2 Extent of Groundwater Contamination

Groundwater samples were not analyzed from this property.

4.5.3.3.3 Impact to Construction

No significant impacts to construction are anticipated at this site. The concentrations of chemical constituents are either below regulatory thresholds, or below the laboratory limit of detection. Special handling or disposal does not appear to be required.

4.5.3.4 Feasibility Study Results

Kleinfelder does not recommend that a feasibility study be conducted for this site.

4.5.3.5 Conclusions

The concentration of metals, asbestos, VOCs, SVOCs, pesticides, and TPH found in the samples collected from the property are relatively low, do not exceed regulatory thresholds, or were not detected in soil. Although groundwater samples were not analyzed, the apparent absence of on-site soil contamination and off-site sources appear to reduce the likelihood of significant impacts to groundwater.

4.5.3.6 Recommendations

No further work is recommended at this time.

4.6 Properties Identified for Potential Acquisition but not Investigated

4.6.1 Station No. 7+210E to 7+520E – Santos (APN 15-04-021)

The Santos property is located adjacent to the east bank of the Guadalupe River between Gold Street and Highway 237 (Plate 4.6.1). The property is adjacent to the east side of the Sainte Claire Corporation (APN15-04-015) property. The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2. of the report.

4.6.1.1 Work Performed

The Santos property was identified as a property of concern during the Level I Investigation (District, 1996) due to its past use as a landfill and current use by Blossom Valley Auto Wreckers. It is currently being used by Santos Wrecking Yard for auto wrecking and dismantling. Kleinfelder did not perform the proposed property investigation due to denial of property access by the property owner during September 1999.

4.6.1.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

4.6.2 Station No. 11+235E to 11+520E – Santa Clara County Transit District (Valley Transit Authority) -APN 97-06-032

The Santa Clara County Transit District (VTA) property is located adjacent to the east bank of the Guadalupe River approximately ½-mile north of Montague Expressway (Plate 4.6.2). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.2.1 Work Performed

The VTA property was identified as a property of concern during the Level I Investigation (District, 1996) due to the past use for agricultural activities. Because the property owner denied access to the property, Kleinfelder did not perform any investigation activities on this property.

4.6.2.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

4.6.3 Hewlett-Packard (APN 97-45-011, 012 and 021 and 97-25-068) Station No. 13+690E to 14+445E – Hewlett-Packard (APN 97-45-011, 012 and 021 and 97-25-068)

The Hewlett-Packard property is located adjacent to the east bank of the Guadalupe River east of Trimble Road (Plate 4.6.3). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.3.1 Work Performed

The Hewlett-Packard property was identified as a property of concern during the Level I Investigation (District, 1996) due to past agricultural activities on the property. Additional concerns were identified during the record review performed for this property prior to initiating field activities. These concerns are summarized as follows:

- Two active USTs, a 12,000-gallon diesel UST and a 750-gallon petroleum UST, are located on the facility;
- The property is a Comprehensive Environmental Response, Compensation and Liability Information Systems (CERCLIS) site due to the presence of solvents in groundwater; and
- The property is a leaking underground storage tank (LUST) site due to the reported leaks from a sump and solvent UST;
- Kleinfelder did not perform the proposed investigation on this property, due to denial of access to the property by Hewlett-Packard.

4.6.3.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

4.6.4 Station No. 7+460E to 7+990E – Sainte Claire Corporation (APN 15-39-020, 026, and 023)

The Sainte Claire Corporation property is located adjacent to the east bank of the Guadalupe River between Gold Street and State Route 237 (Plate 4.6.4). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.4.1 Work Performed

The Saint Claire Corporation property was identified as a property of concern during the Level I Investigation (District, 1996). Additional concerns were identified during the record review performed for this property prior to initiating field activities. The concerns involve the former use of the property identified as APN 15-39-023 as an automobile junkyard, possibly by Blossom Hill Auto Wreckers who occupied adjacent property to the northwest.

Kleinfelder did not perform the proposed investigation on this property due to denial of access to the property by the Saint Claire Corporation.

4.6.4.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this areas.

4.6.5 Station No. 10+490E to 10+700E –Knickerbocker Properties Incorporated (APN 97-06-053)

The Knickerbocker Properties Incorporated property is located adjacent to the east bank of the Guadalupe River between Tasman Drive and Montague Expressway (Plate 4.6.5). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.5.1 Work Performed

The Knickerbocker property was not identified as a property of concern during the Level I Investigation (District, 1996) because it was not considered for acquisition at the time. No additional concerns were identified during the river reconnaissance performed on May 3 to 5, 1999, however the property is thought to have been used in the past for agricultural purposes. Due to access restrictions and constraints, Kleinfelder was not able to complete the planned scope of work at this property.

4.6.5.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

4.6.6 Station No. 12+240E to 12+720E – Renco Associates (APN 97-12-111, 120 and 112)

The Renco Associates property is located adjacent to the east bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.6.6). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.6.1 Work Performed

The Renaissance Associates property was not identified as a property of concern during the Level I Investigation (District, 1996). No additional concerns were identified during the river reconnaissance on May 3 to 5, 1999. Due to access restrictions and constraints, Kleinfelder was not able to complete the planned scope of work at this property.

4.6.6.2 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

4.6.7 Station No. 13+475W to 13+530W – Goguen et al. (APN 97-38-009)

The Goguen et al. (Goguen) property is located adjacent to the west bank of the Guadalupe River on Laurelwood Avenue (Plate 4.7.5). The District initially planned to acquire a 15 foot portion of the property. In late year 2000 the returned project design alternatives excluded the proposed acquisition of the portion of the property. The embankment adjacent to this property may be modified, however the levee area has been addressed with the embankment area in Section 4.2 of the report.

4.6.7.1 Work Performed

The Goguen property was identified as a property of concern during the river reconnaissance conducted by Kleinfelder between May 3 and 5, 1999 due to the observation of an automobile repair and hazardous material storage activities on the property.

4.6.72 Recommendations

If the District considers acquiring the property in the future, Kleinfelder recommends that the investigation proposed in the workplan (Kleinfelder, 1999) be completed prior to property acquisition or construction activities in this area.

Optional Work

4.7.1 Station Nos. 7+400W, 9+620W and 11+500E – URS Greiner Woodward Clyde Geotechnical Borings

The District requested Kleinfelder to investigate soil and groundwater conditions at three locations of concern WB-1 (Station 7-400W), WB-5 (Station 9+620W), and EB-12 (Station 11+50OE). The analyses performed by the District in May 1998 within the District right of way revealed the presence of contaminants of concern t the three locations.

4.7.1.1 Work Performed

Pesticides (WB-5 and EB-12) and mercury (WB-1) were reported by the District at concentrations that exceeded regulatory levels. During Phase I sampling, Kleinfelder advanced one soil boring adjacent to each of the geotechnical borings (EB7+401W, EB9+621W and EB11+501E) to confirm the existence and extent of pesticides and mercury at the three locations. The borings were completed on August 19, 1999 (EB9+621W), August 23/24, 1999 (EB7+401W) and August 31, 1999 (EB11+501E). The borings were completed to a depth of 30.5 feet below TOL. A hollow stem auger was used to advance the borings.

Soil encountered in the borings consisted of primarily clay and sandy clay. The boring logs are presented in Appendix A. Soil samples collected from boring EB7+401W were analyzed for mercury and samples from borings EB9+621W and EB11+501E were analyzed for pesticides. Soil samples were collected and submitted for analysis at the following depths:

- 0.5 to 0.6 m (1.5 to 2.0 feet);
- 0.8 to 0.9 m (2.5 to 3.0 feet);
- 1.4 to 1.5 m (4.5 to 5.0 feet);
- 2.9 to 3.0 m (9.5 to 10.0 feet);
- 3.7 to 3.8 m (12.0 to 12.5 feet);
- 4.4 to 4.6 m (14.5 to 15.0 feet);

- 5.9 to 6.1 m (19.5 to 20.0 feet);
- 7.5 to 7.6 m (24.5 to 25.0 feet); and
- 9.0 to 9.1 m (29.5 to 30.0 feet).

In order to delineate a hot spot of 4,4-DDT, 4,4-DDE and 4,4-DDD in boring EB11+501E, Kleinfelder advanced two soil borings, SEB11+495E and SEB11+505E during Phase II sampling on September 26, 2000. Both borings were advanced at the inboard top of levee, on both side of EB11+501E, to depths of 20 feet bgs using a direct-push rig. The boring logs are presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) - Total and soluble mercury, DDD, DDT, and DDE;
- 0.8 to 0.9 m (2.5 to 3.0 feet) - Total and soluble mercury, DDD, DDT, and DDE;
- 1.4 to 1.5 m (4.5 to 5.0 feet) - Total and soluble mercury, DDD, DDT, and DDE;
- 2.9 to 3.0 m (9.5 to 10.0 feet) - Total and soluble mercury, DDD, DDT, and DDE;
- 4.4 to 4.6 m (14.5 to 15.0 feet) - Total and soluble mercury, DDD, DDT, and DDE; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Total and soluble mercury, DDD, DDT, and DDE.

4.7.1.2 Analytical Results

The following sections summarize the soil analysis results for 31 soil samples and one groundwater sample from the geotechnical borings.

4.7.1.2.1 Soil

Metals

Analytical results for 20 samples are presented in Table 4.7.1.a. The samples were analyzed for the constituent of concern, mercury. Mercury concentrations in each soil sample were compared to the TTLCs and STLCs. Solid material (e.g., soil) with total mercury concentrations exceeding TTLC or soluble mercury concentrations exceeding STLC is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total mercury concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Mercury was detected in seven of the eight samples collected from soil boring EB7+401W at concentrations ranging from 0.053 mg/kg to 6.5 mg/kg. EB7+401W was drilled to confirm the mercury found at Station 7+400W (WB-1). Three of the eight samples contained mercury above ten times the STLC.

Mercury was detected in the twelve samples collected from SEB11+495E and SEB11+505E at concentrations ranging from 0.083 mg/kg to 9.4 mg/kg. These borings were drilled to delineate mercury found in boring EB11+501E. Five of the samples from two borings exceeded ten times the STLC. The WET was performed on all twelve samples. No soluble mercury was detected in the twelve samples.

Pesticides and PCBs

Analytical results for 23 soil samples are presented in Table 4.7.1.b. EB9+621W was drilled to confirm the pesticides found at station 9+620(WB-5). Pesticides of concern 4,4-DDD, 4,4-DDE and 4,4-DDT were found in only one of the four samples collected from EB9+621W. The pesticides in the samples were detected below the TTLC and ten times the STLC.

Soil boring EB11+501E was drilled to confirm the mercury found at station 11+500E (EB12). Pesticides DDD, DDE and DDT were detected at concentrations above the TTLC in one of the seven samples collected from soil boring EB11+501E. Two additional soil borings, SEB11+495E and SEB11+505E were drilled to determine the extent of pesticides found in EB11+501E. Pesticides DDD, DDE and DDT were found at concentrations below their TTLC and ten times their STLC, ranging from 0.00018mg to 0.270 mg/kg.

4.7.1.2.2 Groundwater

One groundwater sample was collected from boring EB11+501E and analyzed for mercury, pesticides, and PCBs. None of the constituents were detected above the reporting limits in sample EB11+501E-W.

4.7.1.3 Discussion

4.7.1.3.1 Extent of Soil Contamination

Mercury was detected in seven of eight samples collected at EB7+401W. Three of the eight samples contained mercury above ten times the STLC but below the TTLC. WET data from other borings in the vicinity suggest the mercury is not soluble.

Boring EB9+621W was drilled to confirm pesticides at Station 9+620W (WB-5). Concentrations of detected pesticides in EB9+621W were below TTLCs and ten times the STLC.

Two borings (SEB11+495E and SEB11+505E) were drilled to delineate pesticide results from EB11+501E (DDD, DDE in DDT above TTLC). Pesticides detected in SEB11+495E and SEB11+505E were below TTLCs and ten times the STLC. Mercury was detected in twelve samples from the borings, below TTLCs. WET analyses of the samples resulted in no soluble mercury detected.

4.7.1.3.2 Extent of Groundwater Contamination

Mercury, pesticides, and PCBs were not detected in the groundwater sample collected from boring EB11+501E.

4.7.1.3.3 Impacts to Construction

Pesticides or mercury were detected above TTLCs in three areas. Mercury above TTLCs was not confirmed at EB7+401W. Pesticides above TTLCs and ten times the STLC were not confirmed at EB9+621W. However, pesticides above TTLCs were delineated between SEB11+495E and SEB11+505E. In this area there are potential impacts to construction from residual pesticides where surface soils or former surface soils beneath the embankment are encountered. Because pesticide concentrations exceeded TTLCs, these soils will require special handling, additional testing, and disposal at a Class I facility. In addition, preventative measures to protect worker health and safety (training, respiratory protection, dust control, etc.) may be required.

4.7.1.4 Feasibility Study Results

Due to the presence of pesticides in the surface soil, a feasibility study should be completed to address material handling and worker safety where the former surface soil beneath the embankment may be encountered. Feasibility study information is presented in Section 4.2.4.

4.7.1.5 Conclusions

Pesticides at concentrations above TTLCs are present in surface soils, and presumably, in former surface soils beneath embankment materials between SEB11+495E and SEB11+505E. If excavated during construction, these materials may require special handling, testing, and disposal. The impacts from groundwater is not known because water samples were not collected or analyzed.

4.7.1.6 Recommendations

Kleinfelder recommends that if the District excavates in the vicinity of geotechnical boring EB12 (between SEB11+495E and SEB11+505E) that excavated soils be handled as hazardous and disposal of accordingly. Excavation, handling and disposal in this area should follow guidance in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

Chemical of concern at the other geotechnical boring locations were not confirmed.

4.7.2 Station No. 8+640E to 8+670E and 14+040E – Investigation of Storm Drains

The two storm drains in question are located adjacent to the east bank of the Guadalupe River, one storm drain was located between Stations 8+640E and 8+670E and the other storm drain was located at station 14+040E on the levee adjacent to the Hewlett Packard (APN 97-45-012) facility. The locations of the storm drains are shown on Plates 4.7.2a and 4.7.2b. The drain at 8+640E to 8+670E is of concern since an apparent pump house with hazardous material placards was located adjacent to the east levee. The drain located at 14+040E is of concern since it had a strong sewage odor.

4.7.2.1 Work Performed

The storm drains were identified as subjects of concern during the river reconnaissance that was performed on May 3 to 5, 1999 by Kleinfelder. Kleinfelder advanced two soil borings, SS8+651E and SS14+036E, near the drain outfalls on July 20, 1999. The soil borings were completed at a depth of 5 feet bgs. The borings were hand augered with the samples collected with a hand operated drive sampler. Soil encountered in both borings consisted of clay. A silty sand layer was encountered at 3.5 feet to 4.5 feet bgs in boring SS14+036E. The boring logs are presented in Appendix A.

Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, pesticides, VOCs, SVOCs, TPHg and TPHd;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Title 22 metals, pesticides, VOCs, SVOCs, TPHg and TPHd;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals, pesticides, VOCs, SVOCs, TPHg and TPHd.

4.7.2.2 Analytical Results

The following sections summarize the results of analyses of six soil samples collected from borings SS08+651E and SS14+036E.

4.7.2.2.1 Soil

Metals

Analytical results for six soil samples are presented in table 4.7.2.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Storm Drain Between Stations 8+640E and 8+670E

Twelve metals were detected in three samples from SS8+651E. All of the metals were below TTLCs and ten times the STLC.

Storm Drain at Station 14+040E

Eleven metals were detected in the three samples from SS14+036E. All metals were below TTLCs and ten times the STLC except for lead and mercury. Lead ranged in concentration from 19 to 170 mg/kg. Ten times the lead STLC was exceeded in SS14+036E-1 and SS14+036E-25. Mercury concentrations exceeded ten times the STLC in all three samples and ranged from 6.7 mg/kg to 8.7 mg/kg.

Pesticides and PCBs

Analytical results for six soil samples are presented in Table 4.7.2.b. A pesticide constituent 4,4-DDD (0.0023 mg/Kg) was detected in sample SS14+036E-1. Aroclor 1260 (0.064 mg/Kg), 4,4-DDD (0.0056 mg/kg), and 4,4-DDE (0.0063 mg/Kg) were detected in sample SS14+036E-4.5. The reported concentrations did not exceed the TTLC and ten times the STLC regulatory standards. Other pesticides and PCBs constituents were not detected in the samples collected from boring SS8+651E.

Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.7.2.c. No VOCs were detected above reporting limits.

Semi-Volatile Organic Compounds

Analytical results for six soil samples are presented in Table 4.7.2.d. SVOCs were not detected above reporting limits.

Petroleum Hydrocarbons

Analytical results for six soil samples are presented in Table 4.7.2.e. TPHd was detected at depths of 2.5 and 4.5 feet bgs in boring SS8+651E (4.8 and 2.6 mg/kg, respectively) and at 1.0 and 2.5 feet bgs in boring SS14+036E (1.9 and 9.0 mg/kg, respectively). TPHg was not detected above reporting limits.

4.7.2.2.2 Groundwater

Groundwater samples were not collected from borings SS8+651E and SS14+036E because groundwater contamination was not a concern.

4.7.2.3 Discussion

4.7.2.3.1 Extent of Soil Contamination

Metals were detected in the soil samples collected from boring SS8+651E, at concentrations were below the TTLC and ten times the STLC. The reported concentrations appeared to be within the normal range of concentrations as compared to other samples collected along the Guadalupe River alignment during this investigation. TPHd was detected in SS8+651E at concentrations of 4.8 and 2.6 mg/kg at depths of 2.5 and 4.5 feet bgs, respectively. These concentrations are considered to be low and do not represent a health risk. TPHd in soil may be due to runoff from parking lots and roads, or possibly from naturally occurring organic materials. Pesticides, PCBs, VOCs and SVOCs were not detected in the soil samples collected from this boring.

Lead (up to 170 mg/kg), and mercury (6.7 to 8.7 mg/kg) concentrations detected in soil samples collected from boring SS14+036E exceeded ten times the respective STLCs. Based on soluble data from elsewhere along the alignment, these metals do not appear to be soluble. The pesticides 4,4-DDD (0.0023 and 0.0056 mg/kg) and 4,4-DDE (0.0063 mg/kg) and the PCB Aroclor 1260 (0.064 mg/kg) were also detected in the soil samples collected from boring SS14+036E. TPHd was detected at concentrations ranging from 0.0019 to 0.0090 mg/kg.

4.7.2.3.2 Extent of Groundwater Contamination

Groundwater samples from this property were not collected.

4.7.2.4 Impacts to Construction

Based on the information obtained from this investigation, it appears that metals, pesticides and TPHd, occur in soil in the vicinity of the storm drain located at station no. 14+036E. However, the concentrations of these constituents are relatively low and will likely not have a significant impact on the Project.

4.7.2.5 Feasibility Study Results

Based on the limited amount of material impacted by metals, Kleinfelder did not perform a feasibility study for soil management in the vicinity of these storm drains. These materials should be included in the soil and management plan, if excavation is required.

4.7.2.6 Conclusions

Based on the data obtained during this property investigation, it is Kleinfelder's opinion that there are no significant environmental impacts to the Project construction.

4.7.2.7 Recommendations

Kleinfelder does not recommend any additional investigation for the storm drains at this time. Guidelines for handling and disposal of excavated sediments and soils will be included in the Soil and Groundwater Management Plan to be prepared by Kleinfelder.

4.7.3 Station No. 13+355W to 13+455W – Levee Adjacent to McLean Property (APN 97-38-016)

The McLean Property is located adjacent to the west bank of the Guadalupe River between Montague Expressway and Trimble Road (Plate 4.7.3). The District does not plan the acquisition of this property; however, the District may raise the levee in this area.

4.7.3.1 Work Performed

The McLean Property was not discussed as a property of concern during the Level I Investigation (District, 1996). A reconnaissance performed by Kleinfelder between May 3 to 5, 1999 observed the presence of numerous hazardous waste drums on the property and strong acetone odors while standing on the levee. Kleinfelder advanced one soil boring, SB13+400W on the property on September 22, 1999. The boring was completed at a depth of 8.0 m (24 feet) bgs. The direct push method was used to collect samples for analytical analysis.

Soil encountered in the boring SB13+400W consisted mainly of clay with a lens of sand between 0.6 to 1.3 m (2.0 and 4.0 feet) bgs. Another sand zone was encountered at the bottom of the boring at 6.3 m (19.0 feet) bgs underlying the clay. The boring log is presented in Appendix A. Soil samples were collected and submitted for analysis as described below:

- 0.2 to 0.3 m (0.5 to 1.0 feet) – Title 22 metals, VOCs, and SVOCs;
- 0.8 to 0.9 m (2.5 to 3.0 feet) – Hold;
- 1.4 to 1.5 m (4.5 to 5.0 feet) – Title 22 metals VOCs, and SVOCs;
- 2.9 to 3.0 m (9.5 to 10.0 feet) – Title 22 metals;
- 4.4 to 4.6 m (14.5 to 15.0 feet) – VOCs, and SVOCs; and
- 5.9 to 6.1 m (19.5 to 20.0 feet) - Title 22 metals.

A groundwater sample was collected and submitted for analysis for VOCs and SVOCs. An additional groundwater sample was collected from the boring for Title 22 metals analyses and placed on hold pending soil analytical results.

4.7.3.2 Analytical Results

The following sections summarize the results of analyses five soil samples and one groundwater sample collected from boring SB13+400W on the McLean property.

4.7.3.2.1 Soil

Metals

Analytical results for four soil samples are presented in Table 4.7.3.a. Metals concentrations in each soil sample were compared to their respective TTLCs and STLCs. Solid material (e.g., soil) with total metals concentrations exceeding TTLCs or soluble metals concentrations exceeding STLCs is considered hazardous waste if excavated, transported, and/or disposed of at an on-site or off-site location. Solid material with total metals concentrations exceeding ten times the STLC requires soluble metals analysis by the Waste Extraction Test (WET) to confirm whether or not the solubility of the metal in the material actually exceeded the STLC (i.e., considered hazardous).

Chromium was detected below the TTLC and ten times the STLC at concentrations ranging from 26 to 34 mg/kg and mercury (0.093 to 2.2 mg/kg) was detected in all samples. The mercury concentration detected in sample SB13+400W-1.5 exceeded ten times STLC.

Arsenic was detected below the TTLC and ten times the STLC at concentrations ranging from 1.4 to 2.9 mg/kg and barium was detected below the TTLC and ten times the STLC at concentrations ranging from 49 to 130 mg/kg in all samples. Cobalt and copper were detected in nine samples with concentrations ranging from 6.5 to 12 mg/kg and 9.2 to 23 mg/kg, respectively. Lead was detected in all samples below the TTLC and ten times the STLC at concentrations ranging from 2.7 to 5.5 mg/kg. Molybdenum was detected at 1.6 mg/kg below the TTLC and ten times the STLC at concentrations in one sample. Nickel was detected below the TTLC and ten times the STLC at concentrations ranging from 31 to 77 mg/kg. Vanadium was detected below the TTLC and ten times the STLC at concentrations ranging from 24 to 34 mg/kg. Zinc was detected in all samples below the TTLC and ten times the STLC at concentrations ranging from 23 to 46 mg/kg in all samples.

Volatile Organic Compounds

Analytical results for three samples are presented in Table 4.7.3.b. VOCs were not detected above the reporting limits.

Semi-Volatile Organic Compounds

Analytical results for three samples are presented in Table 4.7.3.c. Benzo(a)pyrene was detected below the TTLC and ten times the STLC at concentrations ranging from 0.027 mg/kg. Phenol was detected at 0.034 mg/kg, below the TTLC and ten times the STLC, in the 1.5 foot soil sample from boring SB13+400W.

4.7.3.2.2 Groundwater

Groundwater was encountered at a depth of 9 feet bgs in boring SB13+400W. A sample was collected from this boring and analyzed for mercury, VOCs, and SVOCs.

Metals

Mercury was not detected in the groundwater sample.

Volatile Organic Compounds

1,1-Dichloroethane (0.009 mg/L), 1,1-Dichloroethene (0.0054 mg/L), cis-1,2-Dichloroethene (0.00054 mg/L), 1,1,1-Trichloroethane (0.022 mg/L), and Trichlorotrifluoroethane (0.0021 mg/L) were detected in the groundwater sample from boring SB13-400W. The 1,1-dichloroethane, 1,1-dichloroethene, and 1,1,1 thrichloroethane concentrations exceed the General NPDES Permit discharge limit criteria.

Semi-Volatile Organic Compounds

Phenol, a wood preservative and cleaner, was detected in the groundwater sample from boring SB12-400W with a concentration of 0.0024 mg/L.

4.7.3.3 Discussion

4.7.3.3.1 Extent of Soil Contamination

The analytical data for metals indicates that concentrations did not exceed the respective TTLCs in the boring drilled on the levee adjacent to McLean Property. The mercury concentration detected in sample SB13+400W-1.5 exceeded ten times STLC. Soluble metals analyses were not performed for samples from this property. However, based on the soluble mercury data from samples in other parts of the river alignment collected during this investigation, it appears that the mercury is not soluble.

Benzo(a)pyrene (0.027 mg/kg) and phenol (0.034 mg/kg) were detected in the 1.5 foot soil sample from boring SB13+400W. Both reported concentrations are considered low and below general guidelines.

4.7.3.3.2 Extent of Groundwater Contamination

VOCs were reported in the groundwater samples from boring SB13+400W. 1,1-Dichloroethane , 1,1-dichloroethene and 1,1,1-trichloroethane exceeded the General NPDES Permit discharge limits.

Phenol was reported at 0.0024 mg/L in the groundwater sample from SB13+400W below the General NPDES Permit discharge limit. No other SVOCs was reported in the sample from SB13+400W.

4.7.3.4 Impacts to Construction

Based on the information obtained from this investigation, groundwater appears to be impacted with VOCs in excess of General NPDES Permit discharge limits. If the District plans to acquire the property and excavate to groundwater the project may be impacted. If groundwater need to be extracted, treatment would be required prior to discharge. However, since the groundwater was found at 9 feet bgs, it appears that groundwater may not be encountered during levee raising construction. Soil impacts are low and these impacts should not significantly impact construction.

4.7.3.5 Feasibility Study Results

Kleinfelder does not recommend a feasibility study at this time since it appears the District may not acquire a portion of the property and that impacted groundwater may not be encountered during construction. Feasibility study information for groundwater is included with the Embankment Area (Section 4.2.4).

4.7.3.6 Conclusions

Based on the data obtained during this property investigation, it appears that VOCs in groundwater exist beneath the property above the General NPDES Permit discharge critieria. Groundwater was encountered at 9 feet bgs.

4.7.3.7 Recommendations

Kleinfelder recommends no additional sampling of soil or groundwater on this property at this time. If the District acquires the property or excavates in the levee area to groundwater, treatment of extracted groundwater prior to discharge may be necessary. Extraction, treatment and discharge of impacted groundwater should follow guidelines in the Soil and Groundwater Management Plan to be prepared by Kleinfelder. The District should consider limiting any excavation in the area to the summer and fall months to reduce the possibility of encountering groundwater in the levee area during excavation.

4.8 DATA QUALITY REVEIW

Based on the data quality objectives outlined in Section 3.5.1, the Phase II data for 264 samples were reviewed to evaluate the quality of analytical laboratory procedures and the usefulness of the data. The objectives that were evaluated included precision, accuracy, decontamination, completeness, correct holding times, and usefulness of detection limits. The following sections describe the results of the Phase II data review.

4.8.1 Precision

The RPD between the results of laboratory MS samples and MSD was used to evaluate the precision of each batch of samples. The RPDs between LCS and LCSD were also evaluated. These indicators determine the ability to achieve the same result if a sample is analyzed more than once.

The RPDs fell within control limits with a two exceptions. In these cases, the MS/MSD RPDs exceeded the control limits; however, the results of the LCS/LCSD RPDs confirmed the precision of the two batches. Method blanks were run more than once for all sample batches, with RPDs within control limits.

4.8.2 Accuracy

The accuracy of each batch of sample results was evaluated by comparing the known concentration of analytes that were added (spiked) to laboratory control samples to the actual result. This accuracy is indicated by the percent recovery, which should fall within established control limits. This indicator determines the ability to achieve the correct result for a sample with a known concentration.

Surrogate recoveries were measured for each sample and each analysis. For several samples, one or more of the surrogate recoveries occurred outside of the control limits due to matrix interference. For samples which had a high or low surrogate recovery (outside control limits), the sample had a second or third surrogate recovery that was within control limits or the sample was reanalyzed to ensure the accuracy of the results.

The MS/MSD and LCS/LCSD recoveries were also evaluated. Results occurred within control limits, with a few exceptions.

SDG 2000-09-0517

For sample delivery group (SDG) 2000-09-0517, which includes Embankment soil samples collected on September 26, 2000, the pesticide and PCB MS/MSD recoveries were outside of the control range. The LCS/LCSD recoveries were in range, which verifies the accuracy.

SDG 2000-09-0605

For SDG 2000-09-0605, which includes soil samples collected on September 28, 2000 from the Levee Adjacent to Sainte Claire and Reach A properties, the PCB MS/MSD recovery was outside of the control range due to matrix interference. The LCS/LCSD recoveries were in range, which verifies the accuracy.

SDG 2000-10-0047

For SDG 2000-10-0047, which includes soil samples collected on October 2, 2000 from borings SEB7+075E, SEB8+900E, and SEB9+100E; there were a few problems. One of the VOC MS/MSD recoveries was higher than the control limits. However, the other two MS/MSD recoveries was within the limits. Two of the samples had one high surrogate recovery, while the other two sample surrogate recoveries fell with limits.

The MS/MSD recovery for the pesticide analysis was outside of QC limits due to matrix interference. The precision and accuracy were verified by the LCS/LCSD recovery.

4.8.3 Decontamination

Method blank analyses results were evaluated to ensure proper laboratory decontamination procedures. None of the target analytes which were evaluated for this project were detected in any of the laboratory method blanks. This indicates that cross-contamination between samples did not occur.

4.8.4 Completeness

The degree of completeness indicates if all of the samples were collected that were in the sampling plan and if the analytical laboratory performed all of the analyses that were requested. A typical goal for completeness in 90% (HML Users Manual). 1,080 analytical tests were performed on 264 samples. Since 1,085 tests were requested, the percent completeness is 99.5%. The laboratory failed to perform the requested mercury analysis on five samples: 17+250W-15 (inadequate amount of sample), EB7+385W-15, EB8+145W-15, EB9+750W-15, and EB11+600W-15.

4.8.5 Correct Holding Times

All Phase II results were reviewed to determine if analyses were performed within the specific EPA-established holding time for each analysis. Analyses were performed within holding times with the following exceptions:

Property	Sample ID	Pesticide	Mercury	Sample Date
Embankment Samples	EB7+550E-3		X	9/25/00
Embankment Samples	EB10+400E-3		X	10/4/00
Embankment Samples	EB10+400E-15		X	10/4/00
Embankment Samples	EB11+000E-3		X	9/26/00
Embankment Samples	EB11+000E-15		X	9/26/00
Embankment Samples	EB11+600W-3		X	10/3/00
Embankment Samples	EB12+700E-3		X	9/26/00
Embankment Samples	EB12+700E-15		X	9/26/00
Embankment Samples	EB13+900E-3		X	9/26/00
Embankment Samples	EB13+900E-15		X	9/26/00
Levee Adjacent to MacPhee/Barbieri	SEB13+150W-5		X	10/4/00
Renaissance Associates	SEB8+700E-3		X	9/29/00
Renaissance Associates	SEB8+700E-15	X	X	9/29/00

State of CA (APN 15-39-014)	SB7+975E-3		X	10/5/00
State of CA (APN 15-39-014)	SB7+990E-15		X	10/3/00
Gibson-Speno/A-M & Nel Associates	SEB9+000E-15	X	X	10/4/00
Reach A	15+350W-3		X	9/29/00
Reach A	15+600W-3		X	9/27/00
Reach A	15+600W-15		X	9/27/00
Reach A	17+250W-3		X	9/27/00
Reach A	17+550W-3		X	9/27/00
Reach A	17+550W-15			

4.8.6 Usefulness of Detection Limits

The laboratory RDLs were compared to the action levels used for each analyte. If the RDLs were higher than the action level, the data are not as useful because the result cannot be compared to the appropriate TTLC, STLC, General NPDES Permit discharge limit or MCL.

The Phase II soil samples had reporting detection limits that did not exceed the respective TTLCs for total analyses or STLCs for soluble analyses. However, the reporting limits exceeded the MCLs for some groundwater samples from Phase II. In these cases, although the results are reported as less than the RDL (<RDL), the result might still exceeded the MCL. Groundwater results collected from a State of California (APN 15-39-014) property had RDLs that exceeded the MCLs for the following analytes:

Metals

Beryllium

Thallium

Pesticides

Aldrin

Dieldrin

Heptachlor

Heptachlor epoxide

Heptachlorobenzene

VOCs

1,2-Dibromo-3-chloropropane. The RDL for samples collected from the Levee adjacent to MacPhee/Barbieri property also exceeded the MCL.

SVOCs

Benzo(a)pyrene

Pentachlorophenol

PCBs

The RDLs for groundwater samples SB12+185-1, SB12+185-3, SB12+195E-1, and SB12+195E-3 exceeded the MCLs for PCBs. These samples were collected from the levee adjacent to Gibson.

5.0 FEASIBILITY STUDY METHODS

5.1 Objectives Of Remediation

Remediation objectives in general are site-specific. They depend upon such parameters as type and concentration of contaminants reported, present and future land uses, soil types, groundwater use, proximity of water supply wells, site access, utilities present or available, volume of impacted soil and groundwater, type and location of potential receptors, and routes of potential exposure. A remedial approach often utilizes multiple technologies to accomplish cleanup. More than one technology may be used where appropriate for remediation.

In the context of this report, a primary objective of remediation is to avoid costly delays during construction of the Project. As discussed earlier in this report, the Project involves extraction of groundwater for dewatering purposes. We have assumed that more aggressive remedial approaches will be implemented to achieve closure.

In the following section, applicable remedial technologies are identified and screened to address the remediation of contaminants found in source areas at the various properties. Initial screening of the potential technologies is based on their probable effectiveness, implementability, and order-of-magnitude cost to remediate constituents of concern.

5.2 Remedial Options

In this section, various approaches for soil and groundwater restoration are discussed in terms of their effectiveness and applicability.

5.2.1 Remedial Options for Soil

Soil impacts in and adjacent to embankment soils at the various properties generally include trace concentrations of heavy metals, pesticides, solvents and potentially petroleum hydrocarbons. The alternatives discussed below address restoration of soils impacted with these constituents.

No Action

Remediation approaches should always consider target cleanup levels for soil and groundwater restoration. In some cases, the "no action alternative" is an important consideration. Contaminated soils under this alternative would be left "as is" with no mitigative measures taken to reduce exposures to the contamination or to reduce the toxicity, mobility, or volume of contamination. When threats to groundwater or surface water quality are involved, this option is generally not acceptable to regulatory agencies. Soils impacted with hydrocarbons or soluble (mobile) constituents, in general, are a potential source of contamination of groundwater since contaminants could migrate downward to groundwater.

The mobility of metals in the soil matrix can be assessed using a deionized water extraction protocol. This is believed to simulate leaching in under normal conjunction with rain water infiltration or surface water runoff. Long term monitoring may be required as part of the no action alternative. If monitoring results indicate that contaminants have migrated beyond limits originally estimated, remediation may be required.

California enforces a "non-degradation policy" which protects beneficial uses of groundwater. Contamination of soils that could potentially degrade groundwater violates this non-degradation policy.

Vadose zone soil impacted with hydrocarbons at insignificant concentrations (or immobile constituents), below which groundwater would not be degraded, would theoretically not require remediation. This concept has often been termed a "cleanup level". The cleanup level is a concentration near background but above background that can still be considered a "clean closure" for a property. Cleanup levels above background require regulatory approval, and in the case of this Project, require approval from the DTSC and/or RWQCB.

In spite of the availability of technical arguments in some situations for a cleanup level, regulatory agencies generally enforce a "best achievable" concept for soil and groundwater remediation. Therefore if contamination can reasonably be remediated then the cleanup is urged by the regulatory community. Agencies are allowed to consider costs when accepting a cleanup level at a particular property. Cleanup levels can be agreed or "no action" approved for areas of contamination involving excessive cost or financial infeasibility. The "no action" option is retained for consideration at candidate properties.

Containment

Containment of contaminated soils can be accomplished by capping. A cap is a barrier of low permeability placed over contaminated soil. The barrier reduces downward migration through contaminated soils caused by infiltration of rainwater. A cap also reduces or eliminates surface exposures to the contaminants.

A cap would require obtaining Waste Discharge Requirements (WDR's) from the RWQCB if the residual contaminant levels were deemed to be a "designated" waste. Additionally, the RWQCB typically enforces a minimum five foot separation of groundwater and contaminated soil, and may require long term monitoring. If this separation is not achievable, constituents would continue to migrate into and/or dissolve into the groundwater. This option is not considered appropriate based on anticipated future uses of candidate properties.

Soil Ventilation

Soil ventilation (SV) is an often-used in-situ soil remediation technology for volatile chemicals. Soil ventilation entails application of a vacuum to unsaturated soils via vapor extraction wells. Volatile contaminants are thereby extracted from the affected soils. Soil ventilation is a proven technology for the remediation of soils impacted by gasoline and related VOCs. Soil ventilation is not as effective for soils impacted by less volatile/non-volatile compounds (i.e. diesel and other heavier molecular weight hydrocarbons).

SV is also less effective in low permeability soils. Recent improvements in soil venting designs have been shown to enhance the performance of these systems. One such technique is pneumatic fracturing, where compressed air is injected into low permeability soils in conjunction with SV. Site remediation in clay-rich soils has been reported in as little as nine months using this aggressive approach. Another recent SV improvement is thermal enhancement, where impacted soils are heated by hot air or steam injection, or radio frequency heating. Heating increases the vapor pressure of hydrocarbons; by heating hydrocarbon impacted soils, contaminant removal rates (and cleanup time) are accelerated. The cost-effectiveness of these approaches depends on the availability of a heat source and adequate utilities.

One or more of these SV approaches appears to be appropriate for consideration to remediate soils impacted with volatile and semivolatile hydrocarbons. SV is retained for consideration.

Bio-Venting

Bioventing is the augmentation of SV by promoting in-situ biological activity. Generally, the bacteria are indigenous hydrocarbon degraders already acclimated to the site. The bioventing process often uses inlet wells at the perimeter of the soil contamination zone to allow introduction of oxygen, moisture and nutrients as needed. Oxygen is usually the limiting ingredient. Oxygen addition is accomplished in either of two ways. Air can be injected into the subsurface soils with air intrusion wells. Alternatively, a vacuum can be applied to wells, allowing subsurface vapors to replenish oxygen supply. In either case, the air flowrate is generally much lower than that for SV. This technology is generally applied to properties having soils impacted with jet fuel, diesel, and other higher molecular weight organic compounds.

A reasonably high degree of horizontal or vertical soil permeability is needed for this process to be successful. Additional characterization of the bacterial habitat is often required (phosphate and nitrate concentrations, soil moisture , pH, etc.). Soil remediation using bioventing generally takes several years, and the endpoint is uncertain. Therefore, it is not considered appropriate for this Project.

Soil Flushing

Soil flushing is a process of soil remediation where water is infiltrated through the contaminated soil and into the groundwater. The resulting groundwater contamination must then be captured with a groundwater extraction system. This method typically is not effective in the short term using water alone, especially with partially soluble contaminants. Petroleum hydrocarbons, for example, are only sparingly soluble in water.

Specific surfactants can be added to mobilize heavy metals and hydrocarbon contamination out of the soils into the groundwater. Use of surfactants, however, is generally not allowed in

California due to concerns over the potential impact on groundwater quality. This alternative is not considered appropriate based on public and regulatory resistance and uncertain effectiveness.

In-Situ Vitrification

In-situ vitrification uses an electric current to melt soils at extremely high temperatures (1,600 to 2,000^{O} C) destroying the organic pollutants by pyrolysis. Inorganic pollutants are incorporated within the vitrified glass and crystalline mass. Water vapor and organic pyrolysis combustion products are captured at the surface for off gas treatment.

The effectiveness of in-situ vitrification is limited by void volumes, rubble content, and % of combustible organics present by weight. This technology was developed for treatment of radioactive contaminants. It is very costly compared with other alternatives, and is rejected for the purposes of this Project.

Soil Excavation

Excavation of contaminated soils is the most commonly used method for soil remediation. Excavation is accomplished using standard techniques such as a backhoe or excavator. It is of particular interest for this Project in light of the substantial volumes of soil that are already planned to be removed as part of the Project, and is retained for consideration at the various properties.

Excavated soils can be treated on-site for re-use treated on-site for off-site disposal, or treated and disposed off-site. The RWQCB often councils against the replacement of contaminated soil back into an excavation, even if the soil is treated to remove hydrocarbons. This is especially true for the five-foot zone above the water table. For this reason, excavated contaminated soil is often transported off-site for treatment and disposal, or disposal alone.

A brief discussion of on-site treatment options for excavated hydrocarbon contaminated soil follows.

- Controlled Aeration: This entails spreading of the affected soils over a shallow depth and periodic tilling of the affected soils to facilitate transport of contaminants from the soils to the atmosphere. Aeration is a proven technology for the remediation of soils impacted with volatile compounds like gasoline and its constituents. Aerated soils often require off-site disposal when detectable hydrocarbons remain. Air emissions are controlled to the satisfaction of the local Air Quality Management District. This treatment option is not considered appropriate for this Project.

- Soil Washing: A mixture of water, surfactants, and oxidizing or reducing agents is used to extract contaminants in a soil matrix. This method is generally effective for removing heavy metals and organics. Soil washing is reported to have limited success with strongly hydrophobic contaminants where, even with surfactants, the fraction which can remain after washing is unsuitable for on-site placement. Finer grained soils are increasingly difficult to treat successfully as well. Therefore this option is also not considered appropriate.
- Biorestoration: Biorestoration is the stimulation of indigenous (or addition of) hydrocarbon-degrading bacteria to treat the soil for hydrocarbon removal. Methods include use of treatment cells or soil piles, tilling or aeration, and the regular introduction of water and nutrients. The endpoint of biorestoration is difficult to predict in advance and soils may not achieve non-detectable levels in all cases; however, gasoline and diesel contaminated soils can generally be treated to non-detectable levels if treated for a sufficiently long period of time. Generally, the treated soil can be used for surface level backfill or can be disposed at a local landfill. Because of the uncertain timeline, this treatment option is not considered appropriate for consideration.
- Thermal Treatment: Incineration and low temperature thermal desorption are proven and predictable thermal processes for remediation of hydrocarbon contaminated soils. These processes have advantages over aeration and biorestoration. Soil can be processed on-site quickly through mobile thermal treatment equipment and can be remediated with near assurity to non-detectable levels of hydrocarbons. Air emissions are controlled to the satisfaction of the local Air Quality Management District. The treatment requires less space than aeration or biorestoration and is not significantly affected by weather. This option generally is cost-effective with quantities above 1,000 tons. Soils thermally treated on-site may be used as clean backfill (upon regulatory agency approval), or disposed off-site. This option is retained as the preferred on-site treatment method for hydrocarbon impacted soils based on predictable treatment effectiveness, time, and cost.

5.2.2 Remedial Options for Groundwater

Groundwater contamination at the properties investigated is limited to volatile (gasoline range) hydrocarbons, VOCs, and pesticides. The technologies screened below are effective approaches for these constituents.

No Action

Due to the designated beneficial uses for the groundwater and the non-degradation policy, groundwater remediation is often required at sites with known chemical impacts to groundwater; "no action" may not be an acceptable final remedy. Source removal efforts, however, can significantly improve groundwater quality, particularly if capillary fringe soils are addressed.

Agreements not to use groundwater or to provide for wellhead treatment of any extracted groundwater are generally not acceptable response actions for groundwater contamination cases. The required groundwater quality that would signify completion of remediation at a site is a subject for negotiation. Groundwater MCLs are often used as a guide; however, treatment to non-detectable contaminant levels is often the desired goal urged by the regulators. Since groundwater remediation can require years to complete, the groundwater cleanup level is most often left for future negotiation efforts.

The "no action" alternative is often implemented in conjunction with long-term monitoring. It is considered a baseline option, and is retained for consideration at candidate sites.

Extraction of Impacted Groundwater

One often-used approach for groundwater remediation is extraction and aboveground treatment of the contaminated water. Groundwater extraction is often necessary to dewater an excavation as well. Extraction of groundwater can serve three distinct purposes:

- It establishes hydrodynamic control of a dynamic groundwater plume;
- It removes contaminated groundwater, and thereby a small amount of the contamination. (This should *not* be the sole means of remediating a site.); and
- It depresses the water table surface, exposing capillary fringe soils for in-situ soil remediation (particularly soil ventilation).

Extraction of groundwater is accomplished using extraction wells or trenches (in lower permeability soils). Dewatering for excavation is sometimes accomplished by pumping water from the open excavation; this method brings significant sediment loading that makes water treatment for VOCs and hydrocarbons very difficult. Hydrogeologic properties used to design extraction wells or trenches are evaluated using pump tests on "pilot" wells, and computer modeling of the data collected.

Extracted water must be treated and disposed. Disposal options include surface discharge, sewer discharge, or reinjection to groundwater. Only two of these options are available for this Project, surface water discharge and reinjection. (Discharges of groundwater to sewer are not often allowed at the San Jose/Santa Clara Water Pollution Control Plant.) The most common groundwater disposal method in this area is surface water discharge.

Groundwater after extraction will require treatment before being disposed. Technologies to remediate groundwater impacted with hydrocarbons, VOCs, and pesticides only will be considered for this report. Groundwater pretreatment options for these contaminants are discussed briefly below:

- Carbon Adsorption: The technology entails filtration of affected water through a series of granulated activated carbon units (at least two) to adsorb the contaminants from the aqueous phase onto the carbon. The process is cost effective for low flow (less than 10 gallons per minute) and for "polishing" to remove trace concentrations to meet non-detectable discharge levels. When spent, regeneration of the used carbon is performed. Regeneration of the used carbon is typically accomplished at an off-site facility where contaminants are degassed from the carbon and incinerated. Carbon adsorption has been successfully used at many sites for groundwater treatment and is retained for consideration at candidate properties.
- Air Stripping: This technology uses a stripping tower in which the affected water is brought into intimate contact with air to facilitate the transfer of contaminants from the aqueous to air phase. Air stripping has been used effectively for the remediation of groundwater impacted by gasoline and most volatile organic compounds, but not pesticides. Air stripping is a feasible treatment option for extracted groundwater on this Project.

- Bioreactor: This is a biological destruction process using hydrocarbon-degrading bacteria cultures in a large tank or biotreatment cell. A biotreatment cell usually requires more capital and operator maintenance than other treatment options mentioned above, but yields better results when used in conjunction with in-situ bioremediation of groundwater. (Water leaving the biotreatment cell prepared for reinjection is already biologically active). Bioreactors can be unstable and produce an uncertain endpoint, particularly where multiple contaminant types are involved (i.e., VOCs and pesticides). The process was deemed not to be a suitable groundwater treatment option based on higher costs than other options.
- UV-Irradiation: This process uses ultraviolet light to photodegrade the contaminants to carbon dioxide and water. A strong oxidant such as ozone or hydrogen peroxide is used to augment the photodegradation process. Water for this process must have a very low scale-forming tendency or steps need to be taken to control scale formation. This process is both capital and utility intensive but offers the advantage of producing little or no contaminant-containing residuals. The process is a true destruction process. Concentrations of iron, manganese, and hardness of the groundwater often affect the amenability of the affected groundwater for UV Irradiation. Since UV treatment involves high capital and utility costs compared with other options, this option will not be the chosen groundwater treatment option.

In-Situ Bioremediation

In-situ bioremediation is an effective process for the remediation of petroleum hydrocarbons in groundwater. The process entails biostimulation or bioaugmentation of the affected groundwater through addition of nutrients and oxygen, is generally accomplished through the use of injection wells located in the zone of contamination. Groundwater is extracted, nutrients and oxygen are added, and the groundwater is reinjected. Additional pumping helps facilitate mixing of the oxygen and nutrients in-situ. To reduce the possibility of spreading the groundwater plume, extracted water is treated prior to reinjection. Also, hydrodynamic control of the groundwater must be maintained. To reduce mounding, the ability to dispose of some of the extracted groundwater is desirable.

Permitting and design issues related to injection of treated water into subsurface are always subjected to tight regulatory scrutiny. Additionally, reinjection of the groundwater may not be as cost effective as sewer or surface water discharge. Based on stringent regulatory requirements and engineering difficulty related to uniform delivery of nutrients and oxygen to bacteria, in-situ bioremediation was deemed not feasible for this Project.

Air Sparging

Air sparging is the introduction of low pressure air into groundwater to facilitate the mobility of organic contaminants into the groundwater phase. Air sparging also assists biodegradation and strips volatile organics from groundwater to the air phase. Several processes are at work as implied above.

Air sparging can be used to mobilize VOCs which tend to bind to clay and silt in saturated soils. This augment extraction of the contaminants in wells. Air sparging is also a form of in-situ air stripping, entraining the contaminants in the air stream. The sparged air is collected by soil ventilation wells located in the vadose zone. Furthermore, air sparging is an effective means to transfer oxygen to the aquifer to assist with in-situ bioremediation. Air sparging creates some groundwater mounding, and can accelerate groundwater plume migration. It is generally applicable to sites where groundwater is deeper than ten feet below ground surface, and where the water-bearing unit is more than ten feet thick. Air sparging is retained for consideration at candidate sites.

Containment

Impacted groundwater may be contained with subsurface vertical barriers such as slurry walls. Slurry walls are usually constructed in a vertically excavated trench filled with a mixture of bentonite and water. They are often used where the mass of impacted groundwater is too large for practical treatment and where soluble and mobile constituents pose an imminent threat to drinking water sources. Slurry walls can degrade over time, and are uncommon for smaller groundwater plumes. Regulatory approval of this alternative is likely only for large groundwater plumes. Therefore, this alternative is not considered feasible for candidate sites.

6.0 RECOMMENDATIONS

The Level II Investigation of the Lower Guadalupe River included the sampling of soil and/or groundwater and chemical analyses of samples from river sediment, embankment soils and 25 adjacent individual or groups of properties, and areas adjacent to storm drains and geotechnical borings along the Lower Guadalupe river alignment. Seven previously identified properties were not sampled, as the District does not anticipate acquisition of those properties. In Section 4.0 of this report, each of these areas or properties are addressed and conclusions are presented relative to extent of soil and groundwater impacts, impacts to construction and recommendations. Below is a summary of general recommendations. For specific recommendations and details, the reader is referred to the individual sections for each site.

Sediments

Sediment samples were collected in 48 locations. The primary objective of the river sediment investigation was to identify, confirm and evaluate the impacts of hazardous material contamination in river bed sediments or project construction. In general, metals and pesticides were found below TTLCs. In the few cases where metals (i.e., mercury in 2 out of 172 samples) and pesticides (i.e., 4,4-DDT and derivatives in 1 out of 132 samples) were found that exceed TTLCs, they were not confirmed in follow-up sampling efforts. Given the results of this study, we recommend no further assessment of sediment quality. Sampling and analyses may however be required in the future for disposal of dredged river sediments to meet disposal criteria.

Embankments

Kleinfelder drilled in 85 locations (including Reach A) to collect embankment soils for chemical assessment along the Lower Guadalupe study area. The primary objective of the embankment investigation was to identify, confirm and evaluate the impact of hazardous material contamination in embankment areas underlying soils on Project construction.

Lead was detected at concentrations exceeding the current regulatory disposal limit of 350 mg/kg (as required under Assembly Bill AB2784) and TTLC of 1,000 mg/kg in soils in seven borings in four embankment areas. Five of these borings were drilled within an approximate 1,100 foot (350 m) reach of the river alignment near the Gold Street Bridge. Lead above the disposal limits was also found in boring EB8+145W located south of the Highway 237 bridge and at boring EB7+550E located approximately halfway between Highway 237 and Gold Street Bridge on the east bank. Pesticides 4,4-DDT and its derivatives were found in concentrations exceeding TTLC in seven locations. Samples collected either above or below the high 4,4-DDT samples in each boring were found to be below TTLCs. The high 4,4-DDT samples were found sporadically and follow-up samples could not verify the presence of high concentrations of DDT and its derivatives. The eleven areas (or borings) where embankment soils were found with concentrations greater than TTLCs or disposal limits are illustrated on Plates 4.1.a through 4.1.i.

If the District plans excavations for the Project along the inboard embankment areas, listed above Kleinfelder recommends that embankment soils at these eleven locations be segregated during construction. The stockpiles should be sampled and chemically analyzed for contaminants of concern prior to disposal at an appropriate landfill. The District should consider performing additional investigation to define the extent of contamination in the vicinity of boring EB7+550E and EB8+145W and in other areas where data are limited to potentially reduce the volume of impacted soil needing special handling and disposal. Reuse of disposal of soils should be performed following guidance in a Soil and Groundwater Management Plan.

VOCs, SVOCs, metals and/or total petroleum hydrocarbons (diesel) were detected in groundwater adjacent to the levee embankments associated with the individual properties where samples were collected. In seven locations groundwater concentrations of chemical constituents exceeded General NPDES Permit discharge limits. There is some uncertainty regarding whether TPHd found in groundwater is actually diesel or naturally occurring compounds. Details of the groundwater impacts at each property are discussed in the individual property sections (Section 4 of this report).

If the District plans to excavate any of these areas with affected-groundwater listed above, Kleinfelder recommends that the District should plan to treat any groundwater encountered to meet NPDES permit discharge limits prior to discharge. Since the depths to groundwater ranged from about 5 feet to 19 feet in borings and groundwater surface elevations are expected to vary with time and season, the District should consider performing construction of these areas during summer or fall months in order to avoid treating large volumes of groundwater prior to discharge. Finally, dewatering, testing, groundwater treatment and disposal should be carried out following guidance provided in the Soil and Management Plan.

Individual Properties

The District initially planned investigation of 53 individual properties in portion or whole at the beginning of the investigation. Out of the 39 properties investigated only nine would require additional investigation if the District plans to acquire the properties. Fourteen properties could not be investigated due to the denial of Right of Entry by property owners. The purpose of the individual property investigation was to evaluate the impacts of hazardous material contamination on property acquisition, design and construction of the project.

Soil

Pesticides and metals affected soil was found sporadically in individual properties borings. On nine individual properties, pesticides or metals were detected in soil at concentrations that would be considered hazardous for excavation and disposal purposes. For each of the nine properties the affected samples were found in borings at or near the outboard levee toes. The chemical affected soil detected in this investigation may impact the project if the sites are acquired and excavated or if excavation into native soil is performed near the outboard toe. Soil borings associated with the following individual properties (and their individual report section numbers) were found to contain hazardous concentrations of chemicals in soil:

- Section 4.3.6 - Sports and Open Space Authority (pesticides at 1.5 to 2.5 feet);
- Section 4.3.10 - Wyse (pesticides at 1.0 feet);
- Section 4.3.13 - City of San Jose (pesticides at 2.5 to 3.0 feet);
- Section 4.3.14 – Atmel (pesticides at 1.0 to 1.5 feet);
- Section 4.4.1 - Sylvia (mercury at 14.5 and 19.5 feet below top of levee (TOL));
- Section 4.4.2 - SGA Development Partnership (pesticides at 1.0 to 2.5 feet)
- Section 4.4.6 - Gibson and Kay Metals (pesticides at 1.0 feet)

- Section 4.4.9 - Hurlbut Family Trust (pesticides 1.0 feet); and
- Section 4.5.2 - Renaissance Assoc./Gibson-Spino /A-M & Nel Associates (pesticides at 20 feet below TOL).

Kleinfelder recommends that procedures outlined in the Soil and Ground Water Management Plan be implemented should the District acquire any of the above listed properties or if the District excavates at the outboard toe of the levee on District property in the known impacted areas associated with these properties.

Groundwater

Groundwater was sampled within individual properties borings. Six individual properties where chemical concentrations in groundwater exceed General NPDES Permit discharge limits are listed below.

- SCVWD (4.3.1) (VOCs, SVOCs)
- State of California (4.3.3) (VOCs)
- City of Santa Clara (4.3.4) (VOCs)
- City of San Jose (4.3.7) (pesticides)
- State of California (4.3.110 (metals)
- State of California (4.5.1) (metals)
- State of California (4.7.3) (VOCs)

Contaminated groundwater at these sites may impact the project construction and property acquisition if it migrates under the levees to where excavations may be planned. If groundwater is encountered during construction in the adjacent levee areas where chemicals were detected, Kleinfelder recommends that the District test the groundwater prior to discharge to ensure that it meets the NPDES discharge requirements. Testing, treatment and discharge should follow guidelines in the Soil and Groundwater Management Plan.

At the following two individual properties TPHd was reported in groundwater above the General NPDES Permit limits. As noted above there is uncertainty whether the TPHd reported is from diesel or other naturally occurring organic compounds.

- Sainte Claire (4.3.1)
- KLA-Tencor Corporation (4.4.3)

If the District plans excavation in the vicinity of these sites the question as to whether the TPHd is naturally occurring or from diesel product should be answered by further sampling and chromatographic evaluation. This work may eliminate the need for treatment prior to discharge.

Miscellaneous Sites (Optional Work Sites)

Optional work at the site included investigation of soil and groundwater associated with two storm drains and geotechnical boring drilled previously by Woodward Clyde Consultants where contaminants of concern were found. Kleinfelder does not recommend further assessment at the storm drains or geotechnical borings.

Health and Safety Concerns

A number of locations where soil and/or groundwater has been impacted by hazardous materials were documented during this investigation, and further assessment recommendations were provided. The assumption is that every effort will be made to implement remediation (excavation and disposal) prior to initiating construction. If all of the impacted soil is removed no special us of personal protective equipment may be needed for the construction worker and the soils in the areas of no impact would require special handling. However, it is not possible to guarantee that remediation will be completed or that all possible areas of impact were located. For that reason it is important that the construction contractors selected to perform the flood control work are informed about potential hazards and are adequately prepared.

Kleinfelder believes that Title 8 CCR, Section 5192 would apply to this work (Hazard Communication Standard). According to this regulation the District must provide information to the contractor regarding the types and concentrations of hazardous chemicals that may be encountered during construction.

The District also should be aware that the construction contractors to whom bid documents will be sent should have implemented an Injury and Illness Prevention Program in accordance with Title 8 CCR Section 1529. This Injury and Illness Prevention Program should provide for workers who will be in contact with hazardous substances to be 40 hour trained in accordance with the hazardous waste operator emergency response regulation (Title 8 CCR Section 5194). The Injury and Illness Prevention Program also should call for compliance with other applicable Federal, State and local regulations as appropriate

7.0 REFERENCES

California Department of Water Resources. 1975. Evaluation of Groundwater Resources: South San Francisco Bay, Bulletin No. 118-1 Volume III, Northern Santa Clara Valley Area.

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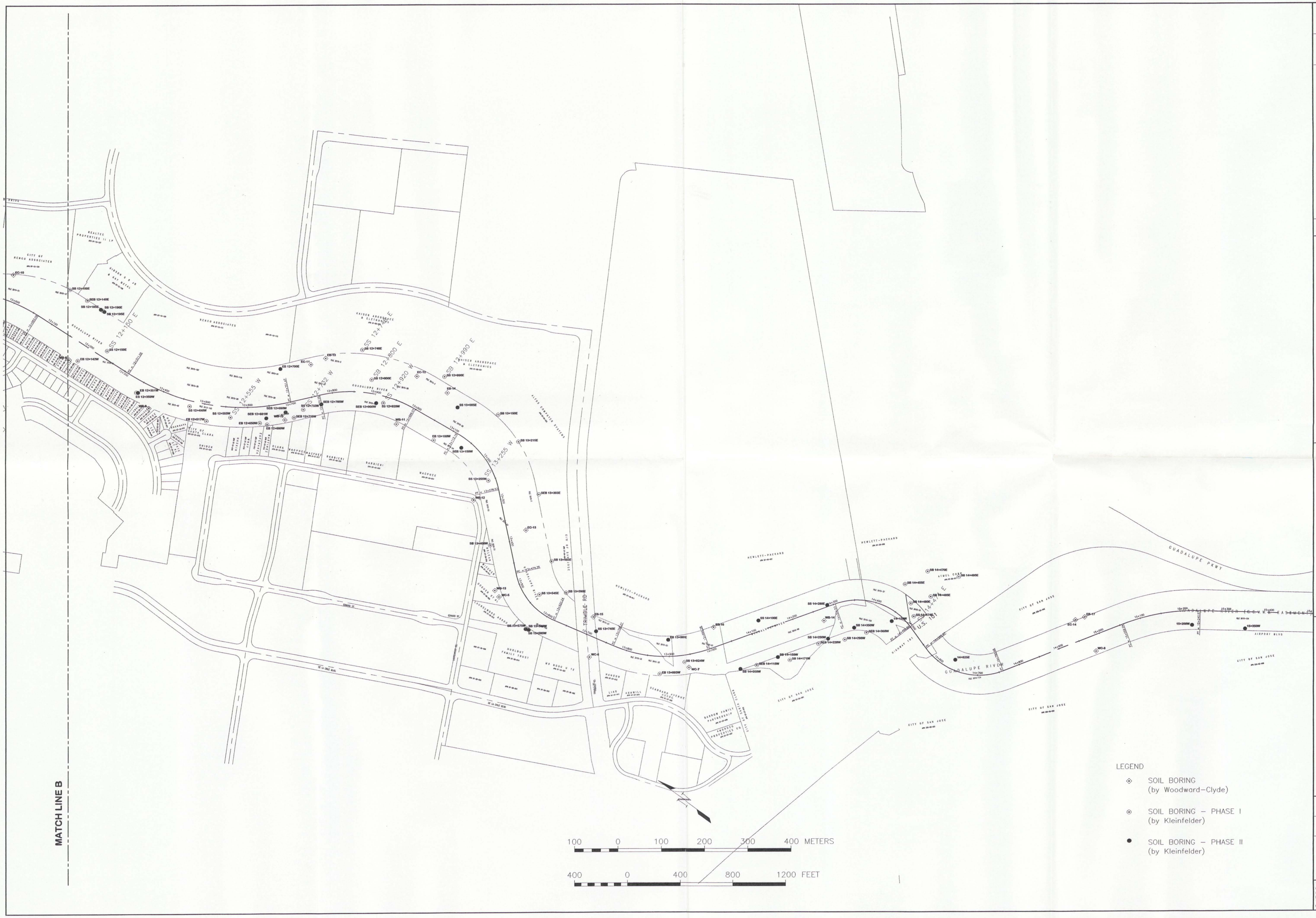

NO.	REVISION	BY	DATE
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SURVEYED BORING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5 6 7 8

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: SURVEYED.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CHA

DATE: 11-28-00
SCALE: SEE BAR SCALE
DRAWING NO. **1C**
3 of **3** sheets

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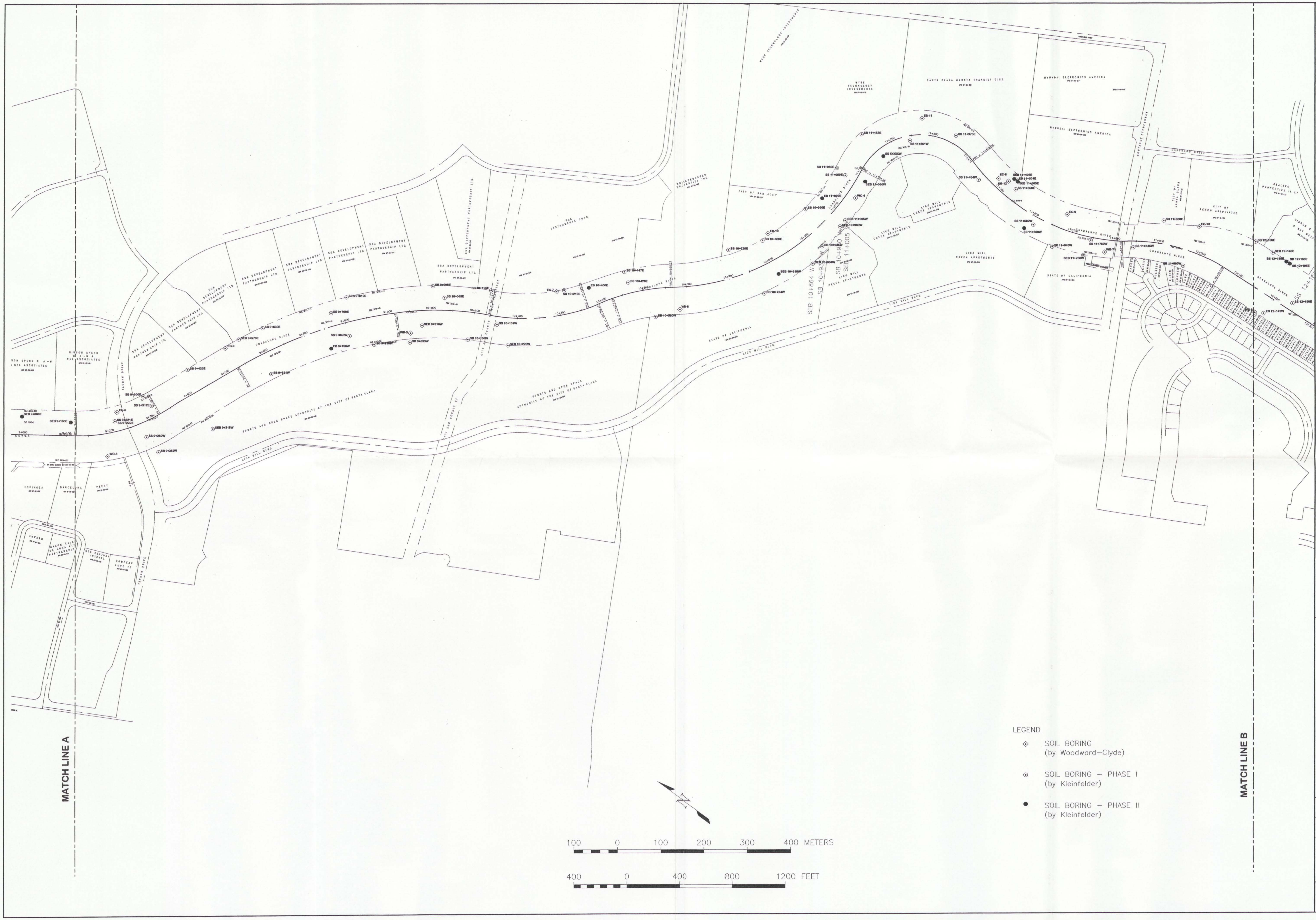
DATE DRAWING PLOTTED: 12-8-00


MATCH LINE A
MATCH LINE B
GUADALUPE RIVER
LICK MILL BLVD.
SEB 10+864 W
SB 10+9
SB 10+90
SEB 11+005
SS 12+1
LEGEND
◈ SOIL BORING (by Woodward–Clyde)
⊙ SOIL BORING – PHASE I (by Kleinfelder)
● SOIL BORING – PHASE II (by Kleinfelder)
N
100 0 100 200 300 400 METERS
400 0 400 800 1200 FEET

NO. | REVISION | BY | DATE

SURVEYED BORING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5 6 7 8

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO. 12–305801–900	ACAD FILE: SURVEYED.dwg

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11–28–00

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SEE BAR SCALE

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2 of **3** sheets

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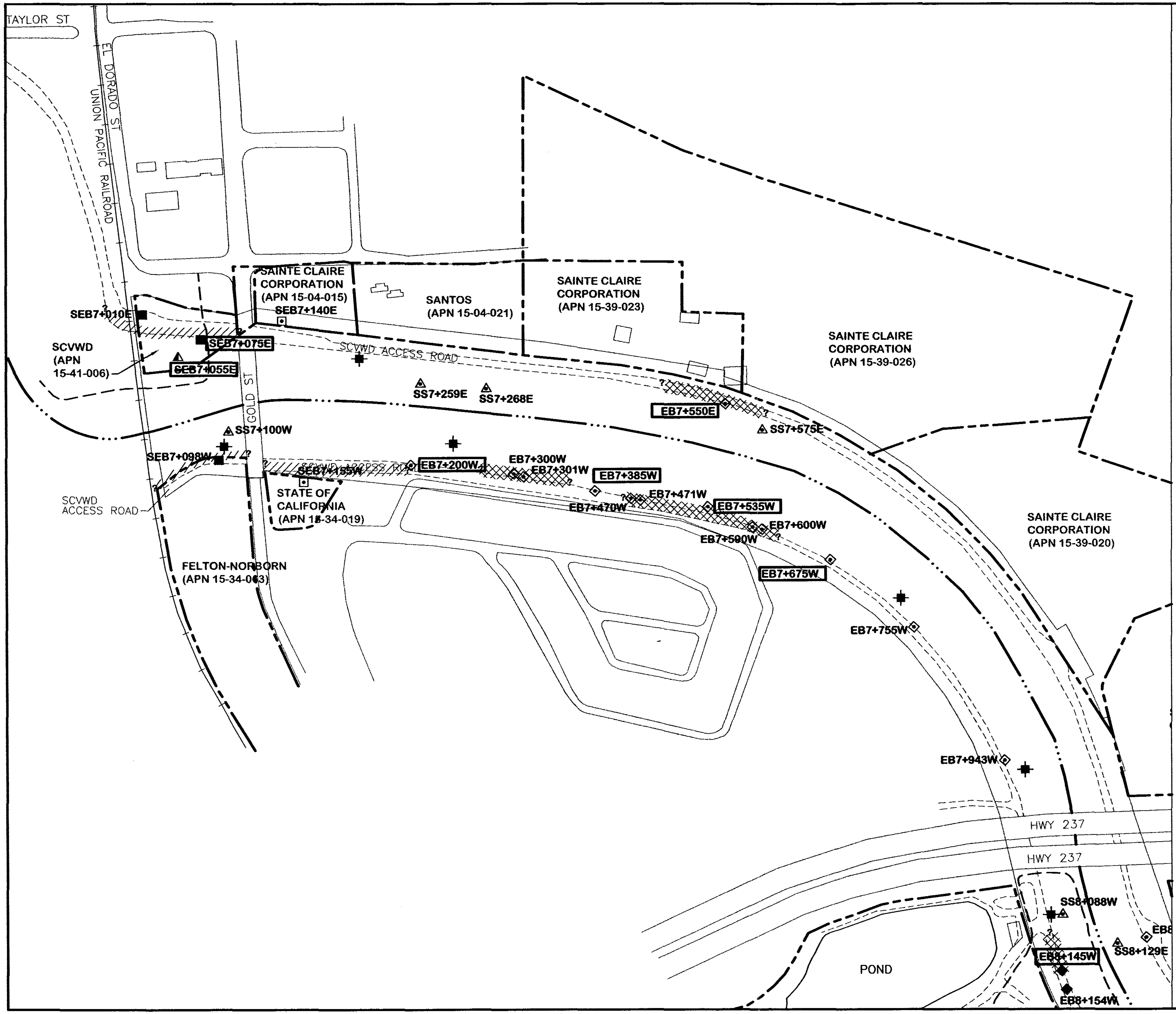


LEGEND

SITE BOUNDARY

GUADALUPE RIVER CHANNEL

PROJECT LIMITS

ARCHEOLOGICAL SITE BOUNDARY

✚ DRAIN OUTFALL

▲ **SS7+259E** RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)

◈ **EB7+300W** EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)

▣ **SEB7+105W** COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)

■ **SEB7+010E** COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)

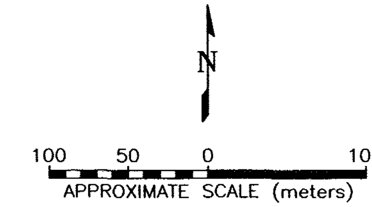
▲ **SEB7+010E** COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)

SEB7+010E SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT

▩ APPROXIMATE AREA WITH METALS IN SOIL IN EXCESS OF TTLCs

▨ IMPACTED GROUND WATER AREA

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	DRAWN BY:	CHECKED BY:	DESIGNED BY:	ACAD FILE:
12-305801-900	LGS	CHA	CC/KB	4_1a.dwg

DATE: 05-10-01
SCALE: SEE BAR SCALE
DRAWING NO.
4.1a

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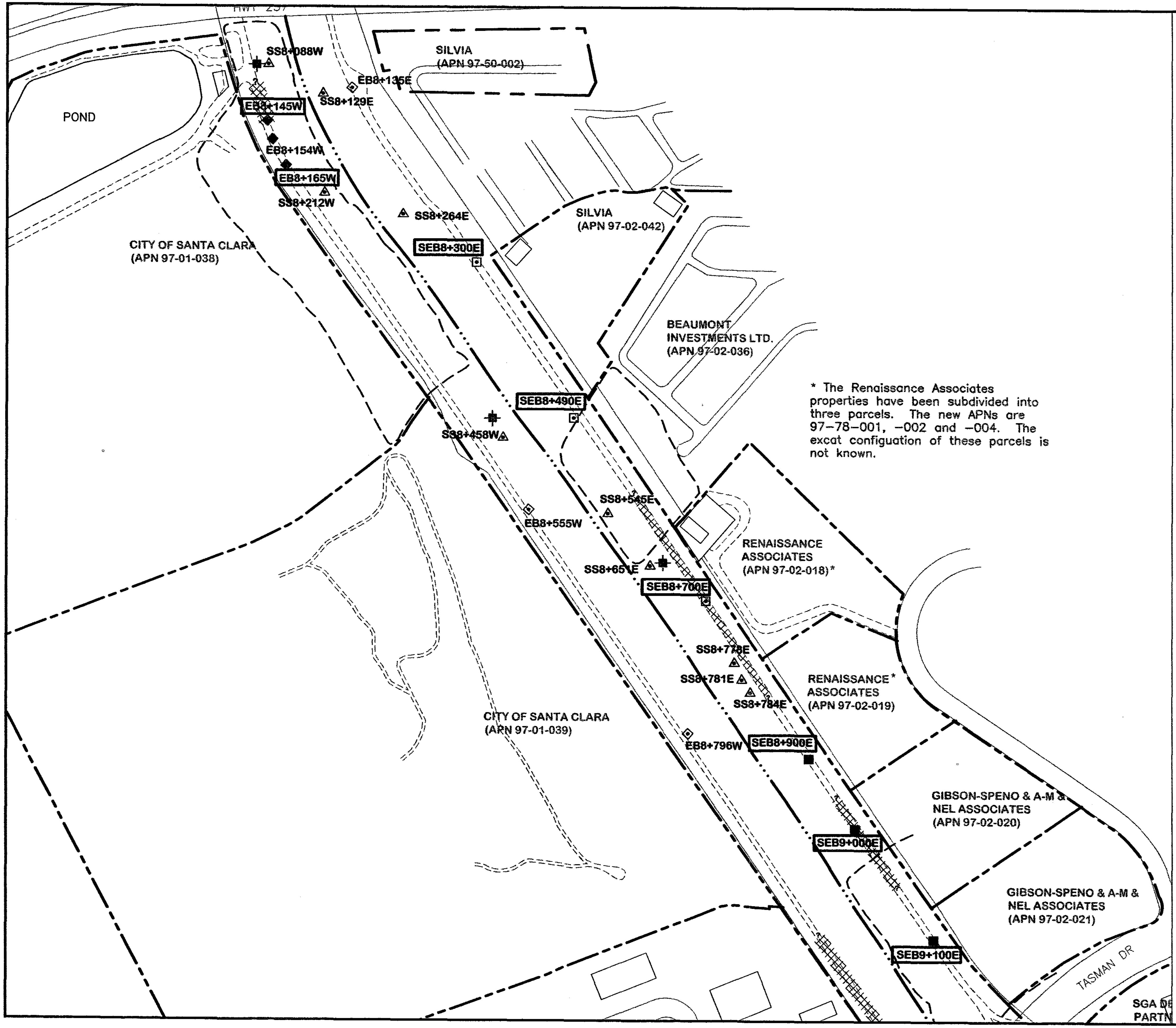
DATE DRAWING PLOTTED: 05-10-01

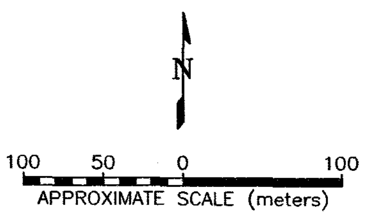


* The Renaissance Associates properties have been subdivided into three parcels. The new APNs are 97-78-001, -002 and -004. The excat configuation of these parcels is not known.

LEGEND

— - — - —	SITE BOUNDARY
—— · · · ——	GUADALUPE RIVER CHANNEL
———	PROJECT LIMITS
- - - - - -	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
▲ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◈ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
◆ EB8+154W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
⊡ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	APPROXIMATE AREA WITH PESTICIDES IN SOIL IN EXCESS OF TTLCs

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1b.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 04-30-01

SCALE: SEE BAR SCALE

DRAWING NO.
4.1b

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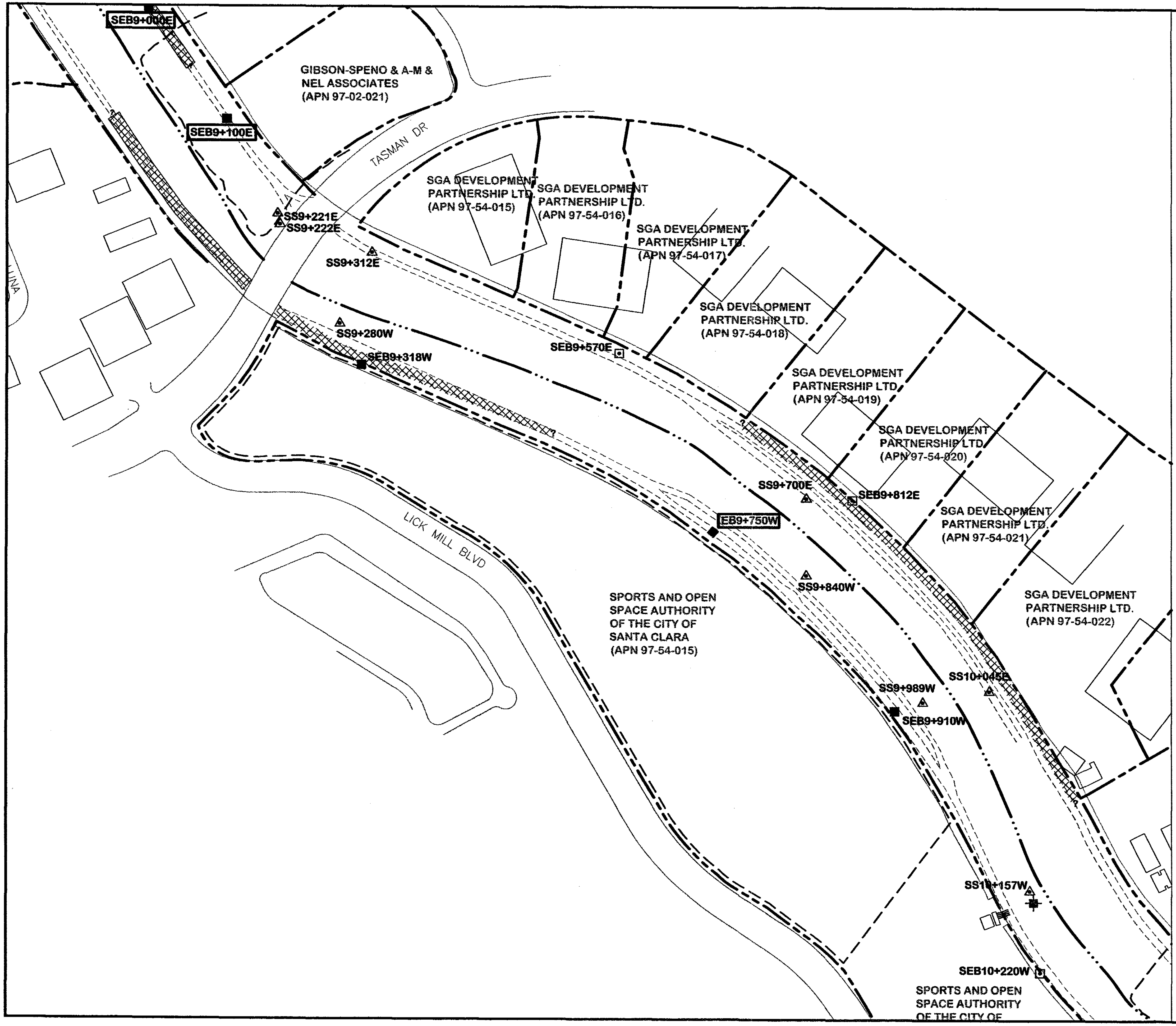
SEB9+000E
SEB9+100E
GIBSON-SPENO & A-M & NEL ASSOCIATES (APN 97-02-021)
TASMAN DR
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-015)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-016)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-017)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-018)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-019)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-020)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-021)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-022)
SS9+221E
SS9+222E
SS9+312E
SS9+280W
SEB9+318W
SEB9+570E
SS9+700E
SEB9+812E
EB9+750W
SS9+840W
LICK MILL BLVD
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF SANTA CLARA (APN 97-54-015)
SS10+045E
SS9+989W
SEB9+910W
SS10+157W
SEB10+220W
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF

LEGEND

— - - —	SITE BOUNDARY
— · · · —	GUADALUPE RIVER CHANNEL
═══	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
▲ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas noted as Archeological sites)
◆ EB9+750W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
▣ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	APPROXIMATE AREA WITH POTENTIAL PESTICIDE IN SOIL IMPACTS

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1c.dwg
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DATE: 05-09-01
SCALE: SEE BAR SCALE
DRAWING NO. **4.1c**

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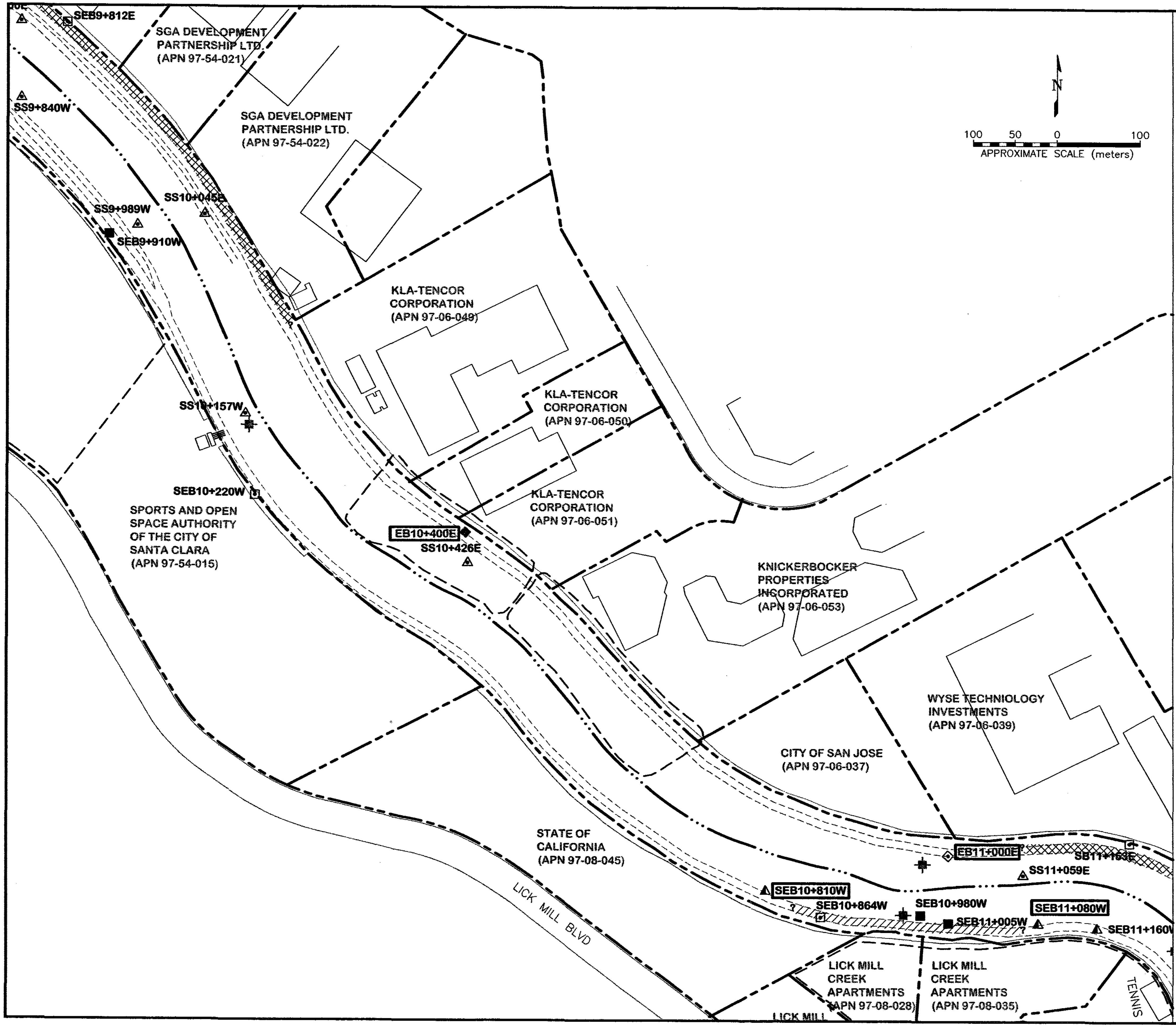
SEB9+812E
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-021)
SS9+840W
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-022)
N
100 50 0 100
APPROXIMATE SCALE (meters)
SS10+045E
SS9+989W
SEB9+910W
KLA-TENCOR CORPORATION (APN 97-06-049)
KLA-TENCOR CORPORATION (APN 97-06-050)
SS10+157W
SEB10+220W
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF SANTA CLARA (APN 97-54-015)
KLA-TENCOR CORPORATION (APN 97-06-051)
EB10+400E
SS10+426E
KNICKERBOCKER PROPERTIES INCORPORATED (APN 97-06-053)
WYSE TECHNIOLOGY INVESTMENTS (APN 97-06-039)
CITY OF SAN JOSE (APN 97-06-037)
STATE OF CALIFORNIA (APN 97-08-045)
LICK MILL BLVD
EB11+000E
SB11+163E
SS11+059E
SEB10+810W
SEB10+864W
SEB10+980W
SEB11+005W
SEB11+080W
SEB11+160W
LICK MILL CREEK APARTMENTS (APN 97-08-028)
LICK MILL CREEK APARTMENTS (APN 97-08-035)
TENNIS
LICK MILL

LEGEND

— - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
——	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
▲ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◇ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
◆ EB8+154W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
⊡ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem Auger)
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	POTENTIAL VOC/SVOC IMPACTED GROUND WATER AREA
▩	APPROXIMATE AREA WITH PESTICIDE IMPACTS (SOIL)

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:
12-305801-900	4_1d.dwg

DRAWN BY:	CHECKED BY:	DESIGNED BY:
LGS	CHA	CC/KB

DATE:
05-09-01

SCALE:
SEE BAR SCALE

DRAWING NO.
4.1d

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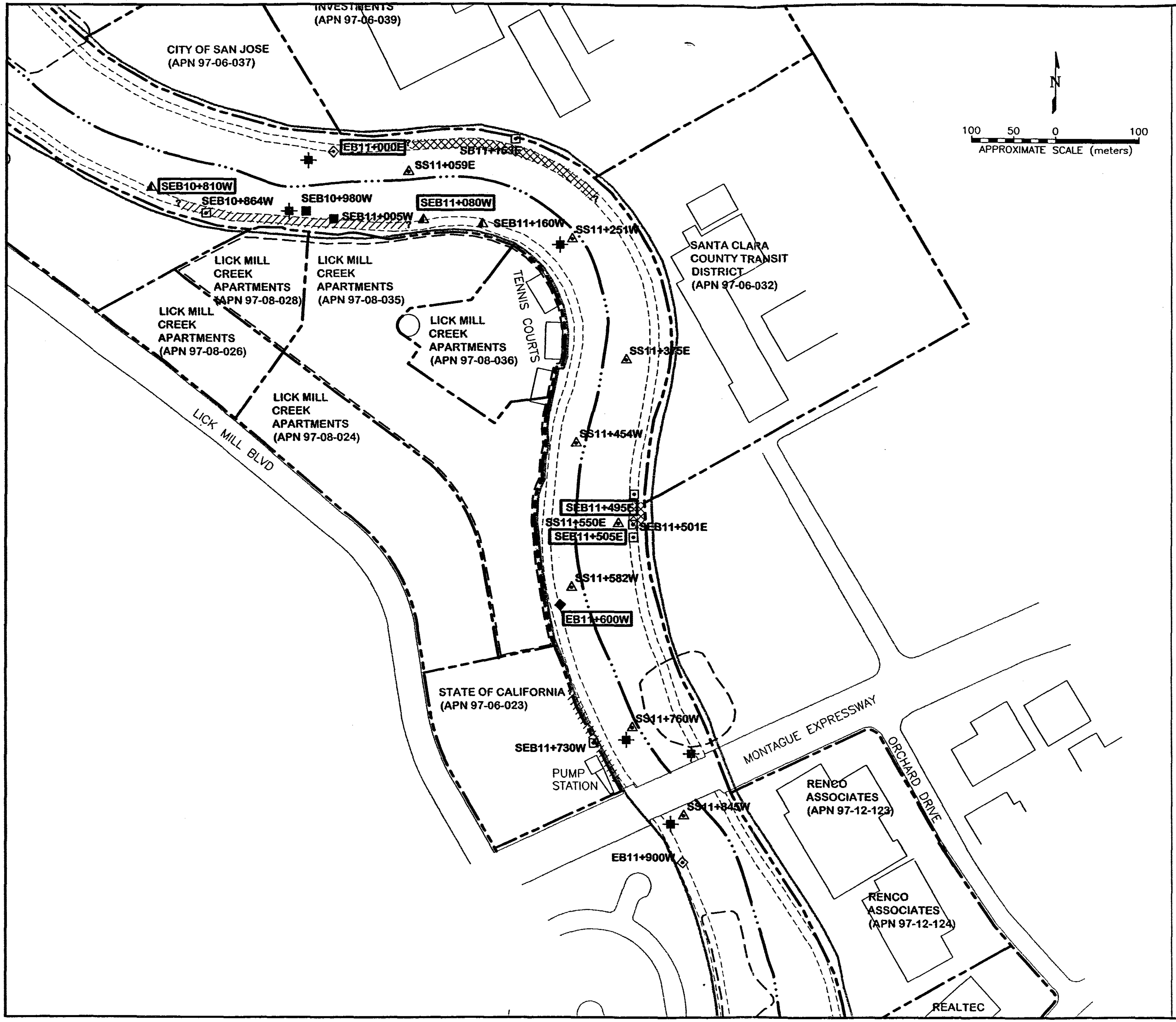
INVESTMENTS
(APN 97-06-039)
CITY OF SAN JOSE
(APN 97-06-037)
EB11+000E
SB11+163E
SS11+059E
SEB10+810W
SEB10+864W
SEB10+980W
SEB11+005W
SEB11+080W
SEB11+160W
SS11+251W
LICK MILL CREEK APARTMENTS (APN 97-08-028)
LICK MILL CREEK APARTMENTS (APN 97-08-035)
LICK MILL CREEK APARTMENTS (APN 97-08-026)
LICK MILL CREEK APARTMENTS (APN 97-08-036)
LICK MILL CREEK APARTMENTS (APN 97-08-024)
TENNIS COURTS
SANTA CLARA COUNTY TRANSIT DISTRICT (APN 97-06-032)
SS11+375E
SS11+454W
SEB11+495E
SS11+550E
SEB11+501E
SEB11+505E
SS11+582W
EB11+600W
LICK MILL BLVD
STATE OF CALIFORNIA (APN 97-06-023)
SS11+760W
SEB11+730W
PUMP STATION
MONTAGUE EXPRESSWAY
ORCHARD DRIVE
RENCO ASSOCIATES (APN 97-12-123)
SS11+845W
EB11+900W
RENCO ASSOCIATES (APN 97-12-124)
REALTEC
N
100 50 0 100
APPROXIMATE SCALE (meters)

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
——	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
▲ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◇ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
◆ EB8+154W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
▣ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▩	APPROXIMATE AREA WITH PESTICIDE IMPACTS (SOIL)
▨	IMPACTED GROUND WATER AREA

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE

EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1e.dwg
DRAWN BY: LGS
CHECKED BY: CHA
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DATE: 05-09-01
SCALE: SEE BAR SCALE
DRAWING NO. 4.1e

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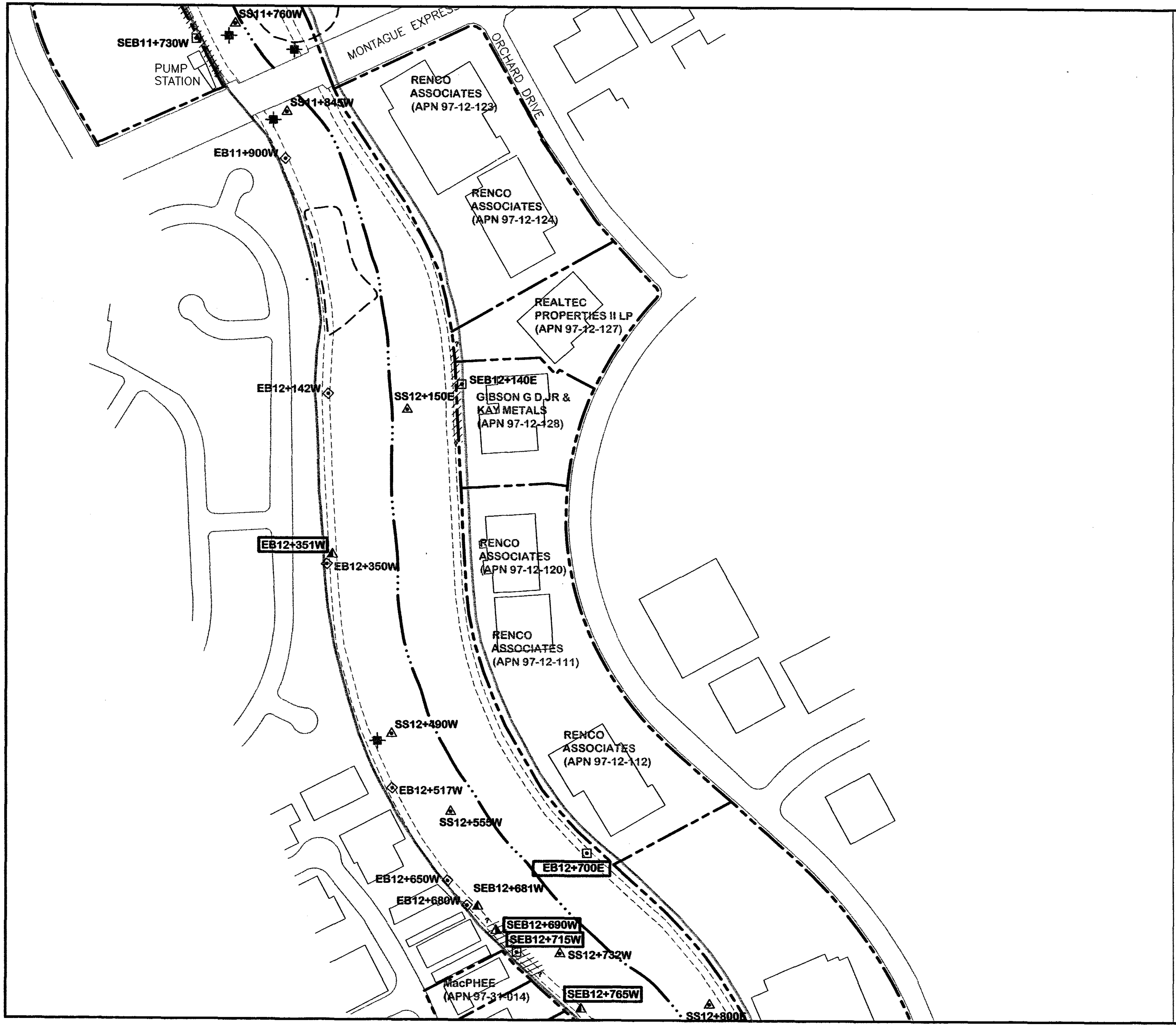

LEGEND

— - - —	SITE BOUNDARY
—··—	GUADALUPE RIVER CHANNEL
——	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
△ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◇ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
◆ EB8+154W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
▣ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
▲ SEB12+690W	EMBANKMENT BORING (installed by Hand Auger)
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	IMPACTED GROUND WATER AREA

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1f.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 05-09-01
SCALE: SEE BAR SCALE
DRAWING NO. **4.1f**

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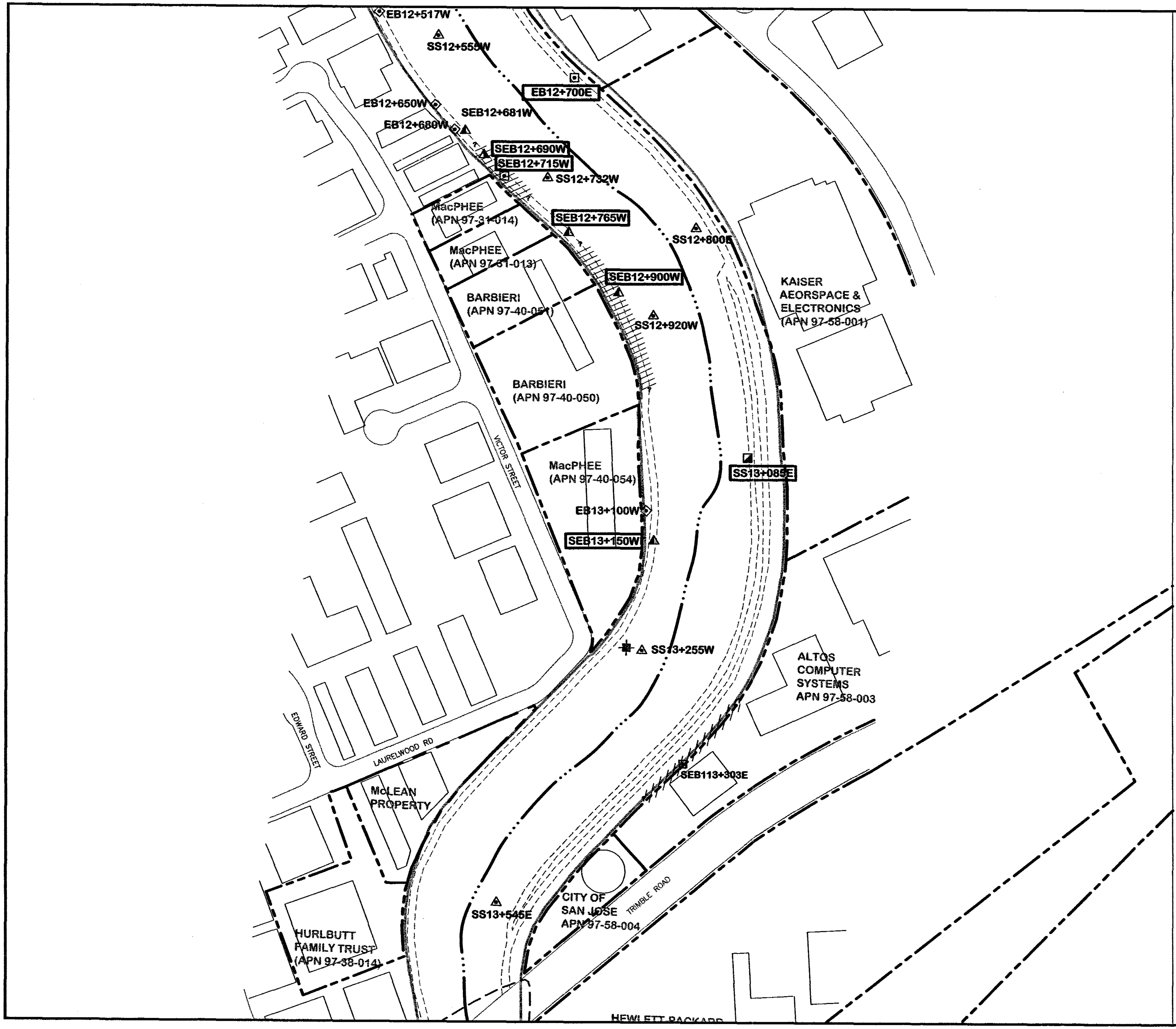

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
═══	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✛	DRAIN OUTFALL
⚠ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◈ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
⊡ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
▲ SEB12+690W	EMBANKMENT BORING (installed by Hand Auger)
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
◩ SS13+080E	RIVER SEDIMENT SAMPLE (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	APPROXIMATE AREA WITH GROUND WATER IMPACTS

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1g.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 04-30-01
SCALE: SEE BAR SCALE
DRAWING NO. 4.1g

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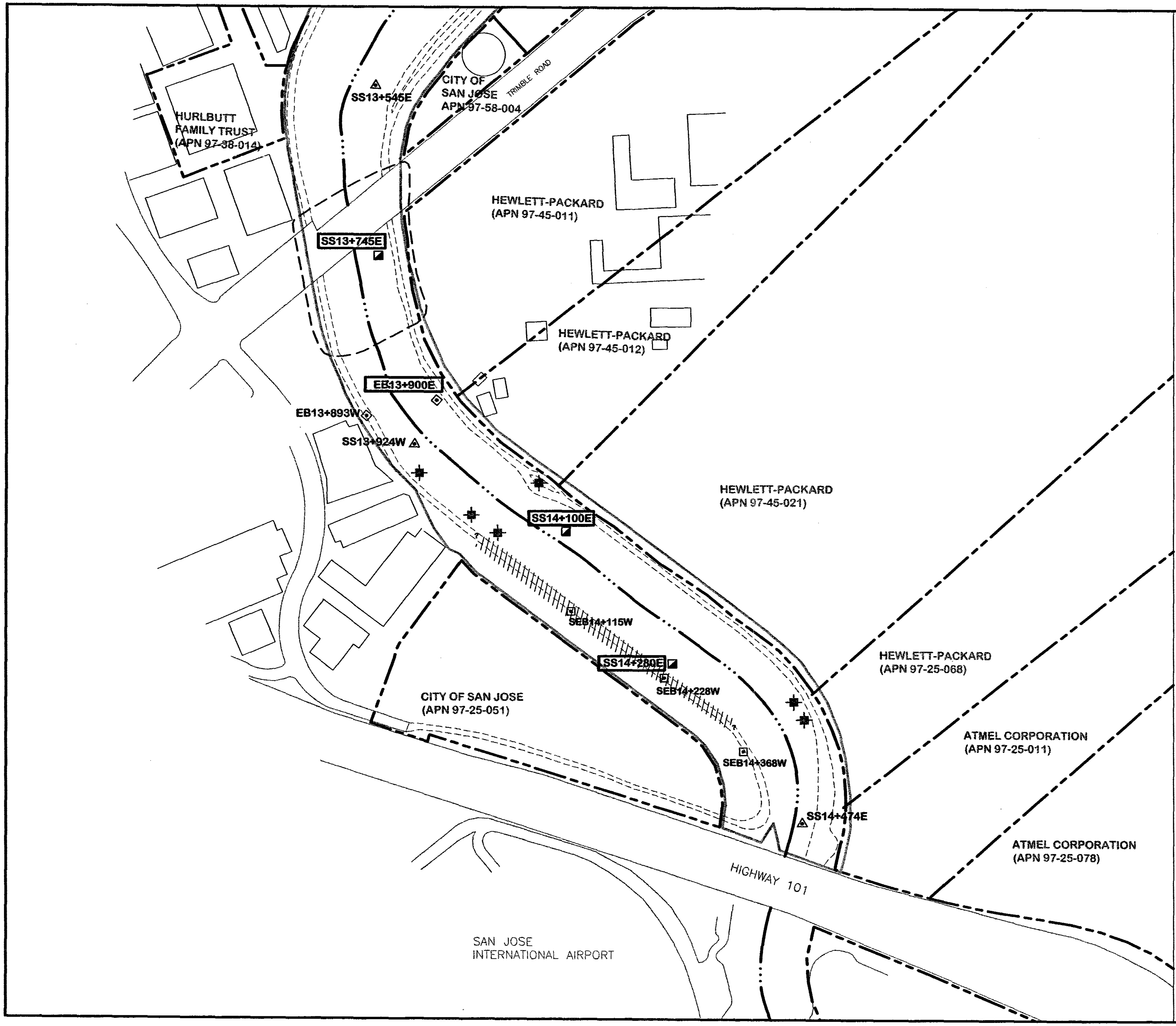
HURLBUTT FAMILY TRUST (APN 97-38-014)
SS13+545E
CITY OF SAN JOSE APN 97-58-004
TRIMBLE ROAD
HEWLETT-PACKARD (APN 97-45-011)
SS13+745E
HEWLETT-PACKARD (APN 97-45-012)
EB13+900E
EB13+893W
SS13+924W
HEWLETT-PACKARD (APN 97-45-021)
SS14+100E
SEB14+115W
SS14+280E
SEB14+228W
HEWLETT-PACKARD (APN 97-25-068)
CITY OF SAN JOSE (APN 97-25-051)
SEB14+368W
ATMEL CORPORATION (APN 97-25-011)
SS14+474E
ATMEL CORPORATION (APN 97-25-078)
HIGHWAY 101
SAN JOSE INTERNATIONAL AIRPORT

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
═══	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
◈ EB7+300W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
▣ SEB7+105W	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
▲ SS7+259E	RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)
◪ SS13+080E	RIVER SEDIMENT SAMPLE (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	APPROXIMATE AREA WITH SOIL IMPACTS

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
△			
△			
△			
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△			

EMBANKMENT SOIL AND RIVER SEDIMENT SAMPLING LOCATIONS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_1h.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 05-09-01
SCALE: SEE BAR SCALE
DRAWING NO. **4.1h**

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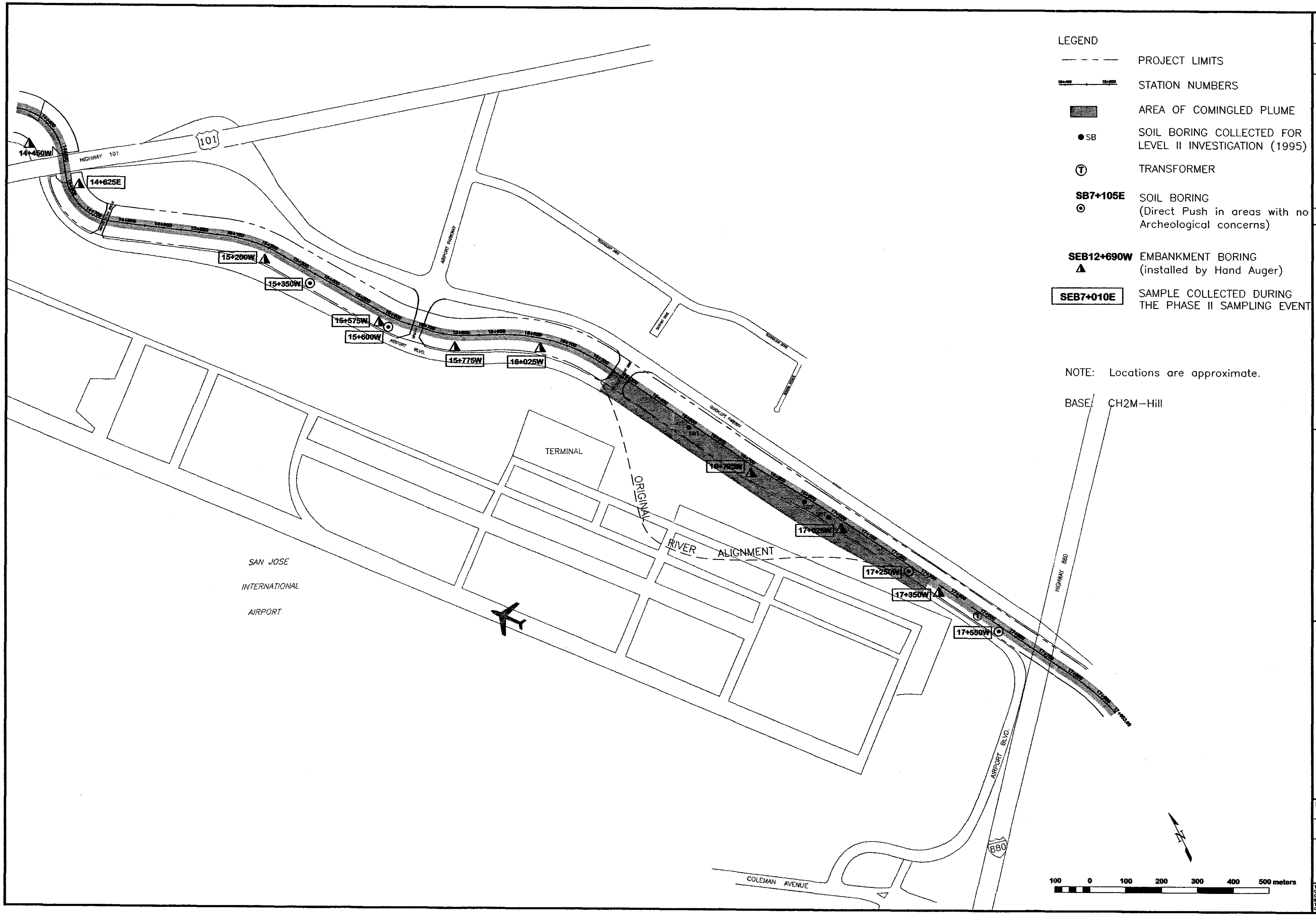

NO.	REVISION	BY	DATE

REACH A SITE PLAN

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:

SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER

1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:
12-305801-900	4_1i.dwg

DRAWN BY:	CHECKED BY:	DESIGNED BY:
LGS	CHA	CC/KB

DATE: 04-30-01

SCALE: SEE BAR SCALE

DRAWING NO. **4.1i**

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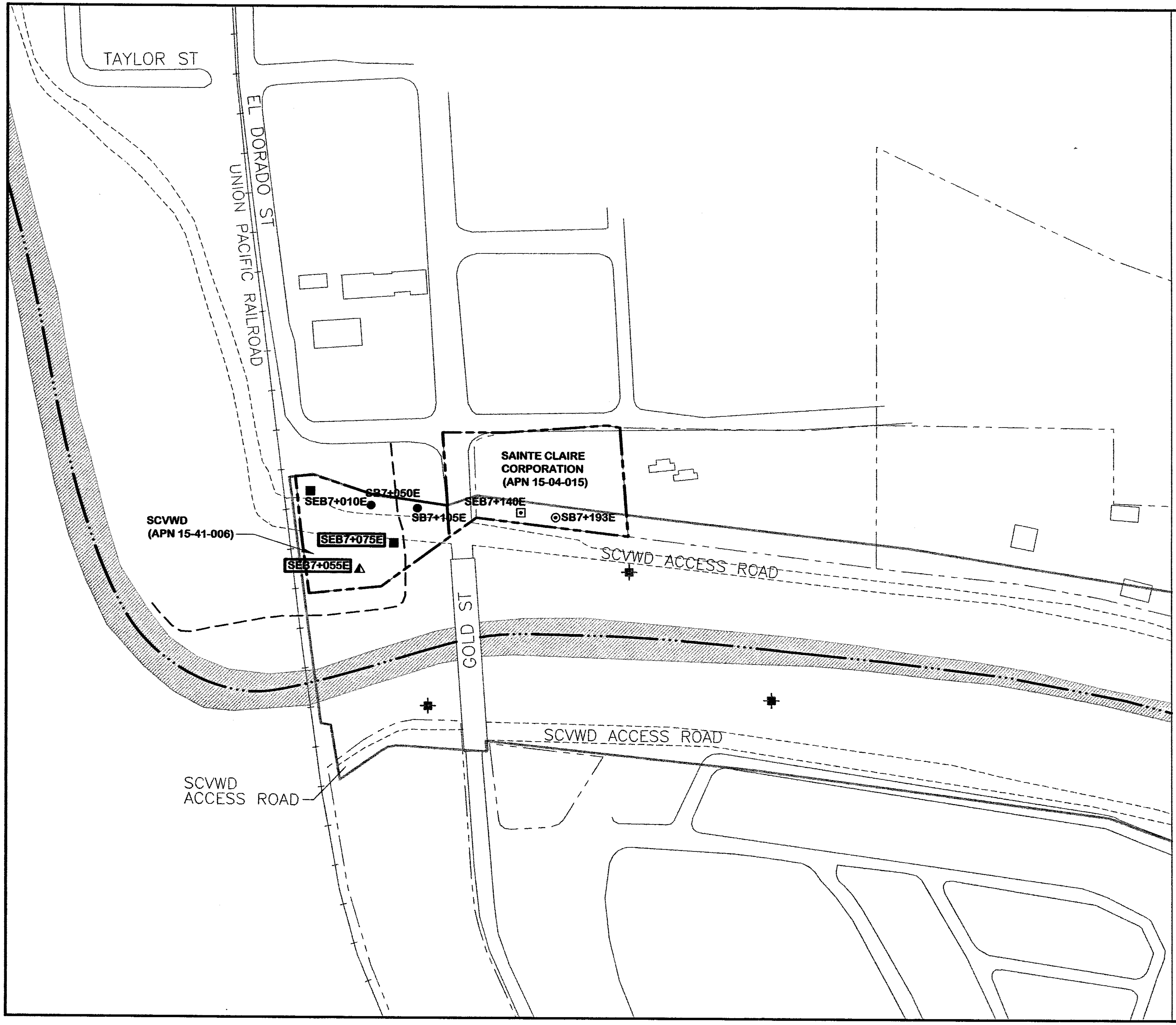
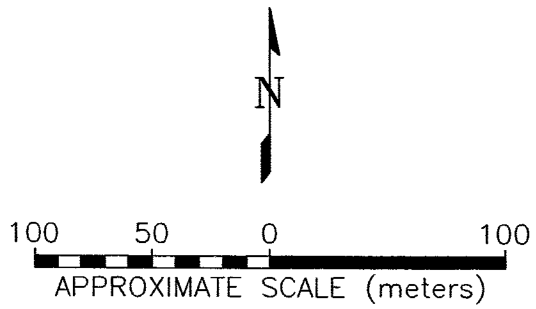


LEGEND

— - —	SITE BOUNDARY
—···—	GUADALUPE RIVER CHANNEL
——	PROJECT LIMITS
- - -	ARCHEOLOGICAL SITE BOUNDARY
✣	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
● **SB7+050E**	SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
⊡ **SEB7+140E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ **SEB7+010E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
▲ **SEB7+010E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 1," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SCVWD/SAINTE CLAIRE CORP.
(APN 15-41-006 &15-04-015)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_3-01.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 05-09-01
SCALE: SEE BAR SCALE
DRAWING NO. **4.3.1**

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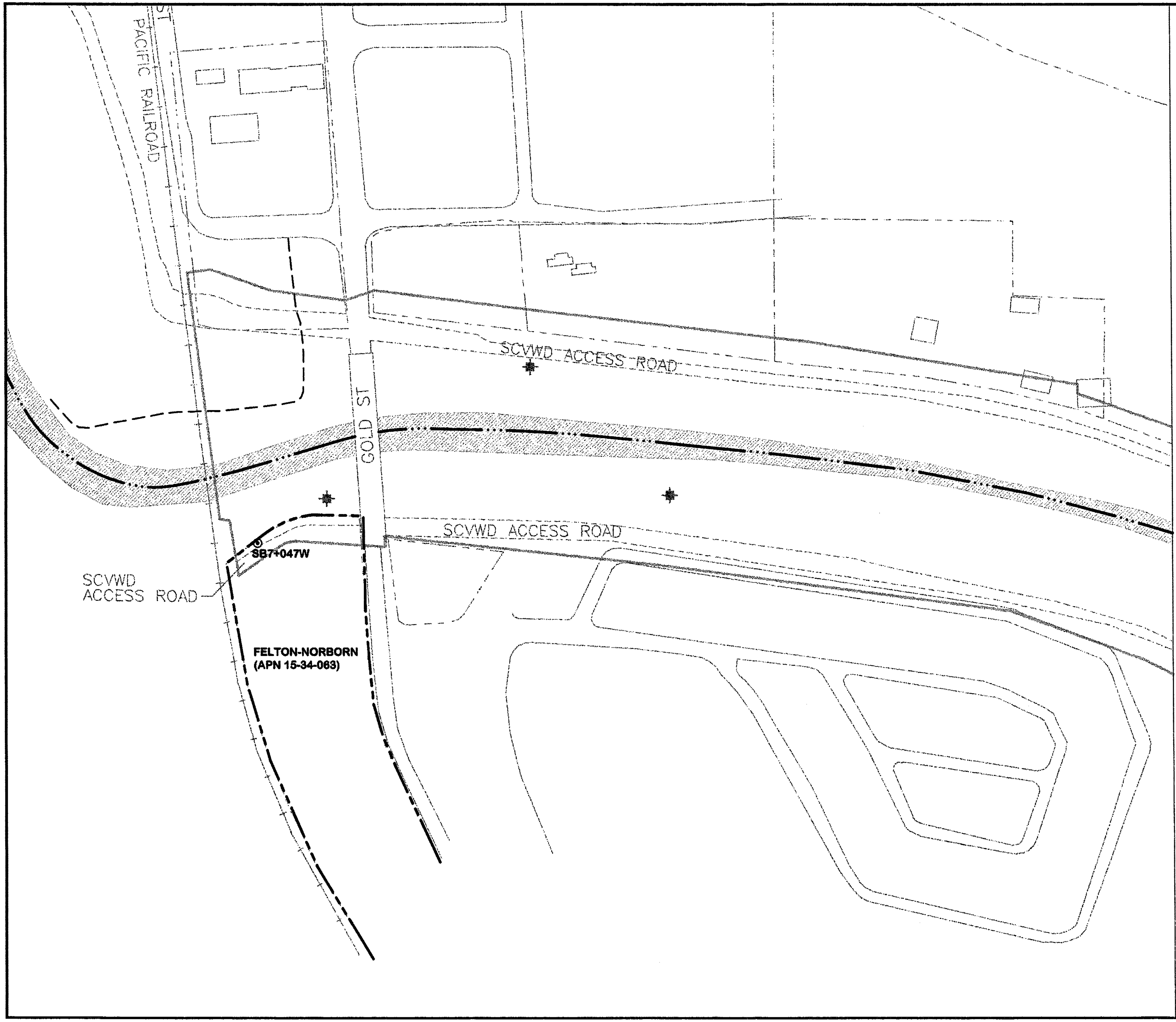

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER
▨	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
⊙ SB7+105E	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTES:
Locations are approximate.

No access was granted for this property. Borings will be placed on District Access Road.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 1," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
FELTON-NORBORN

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.: 12-305800-001
ACAD FILE: 12305801\4_3-02.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.3.2**

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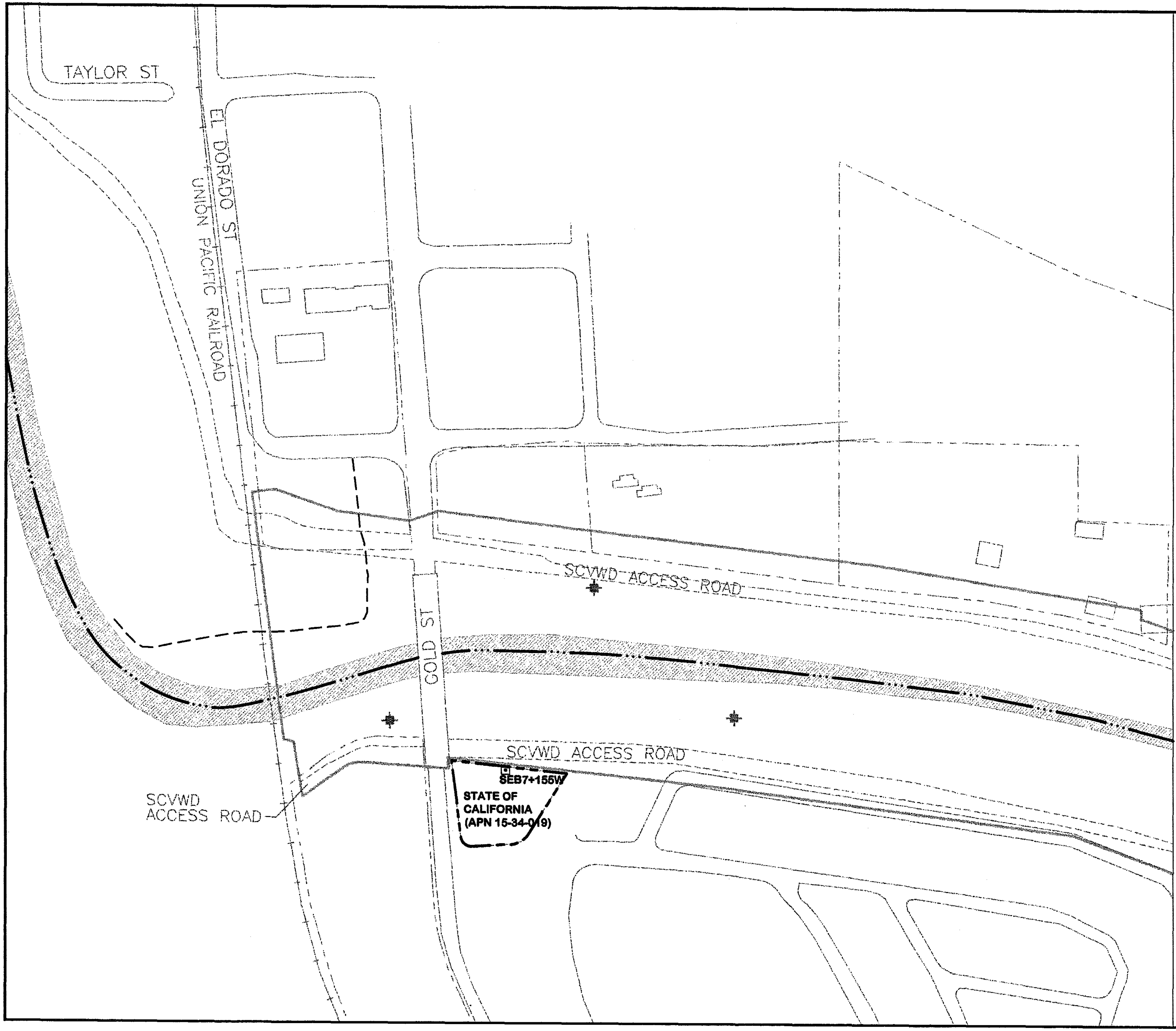

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER
▨	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
▣ SEB7+140E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Geoprobe Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 1," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
STATE OF CALIFORNIA
(APN 15-34-019)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-03.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO.
4.3.3

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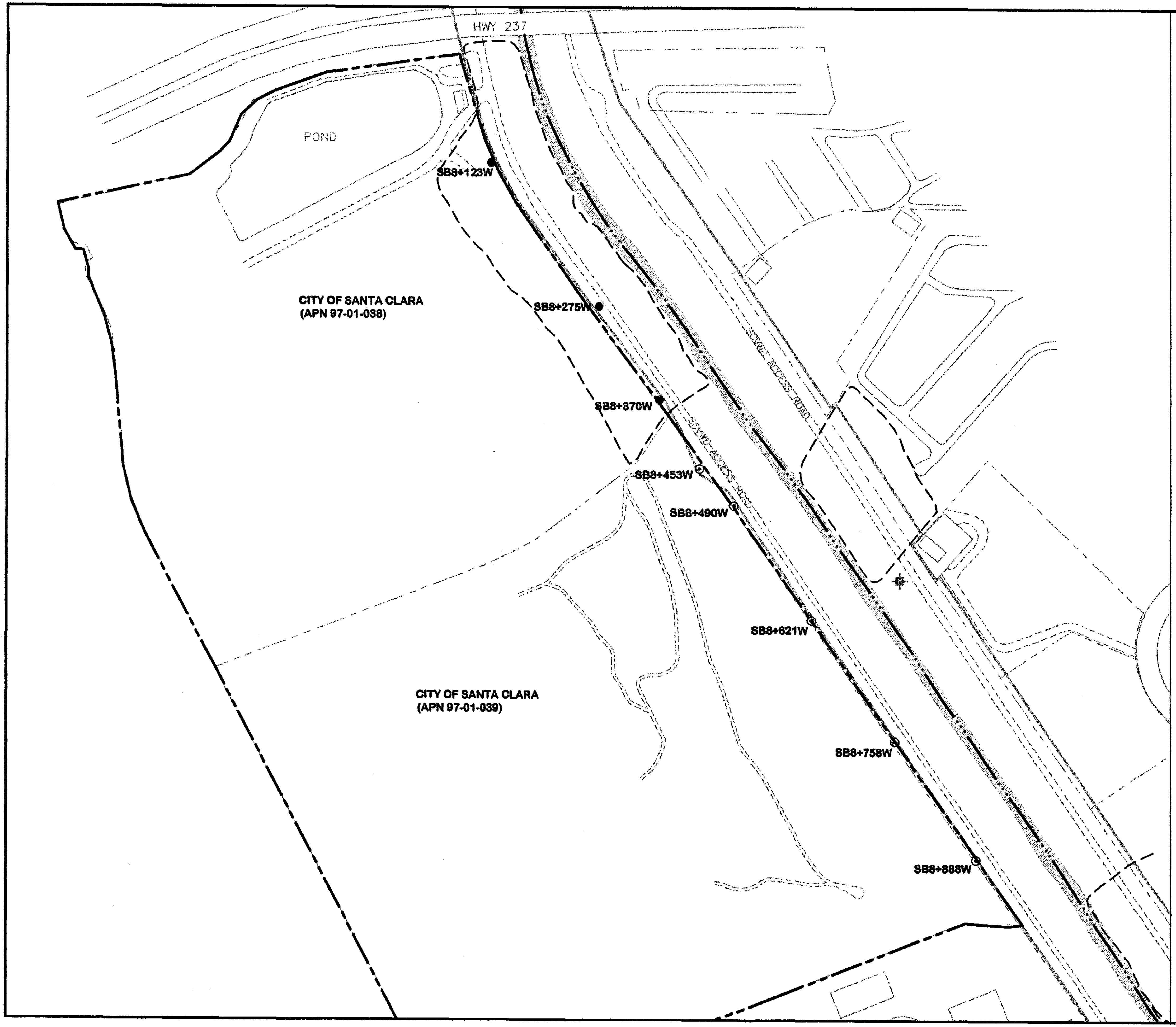

LEGEND

— - — -	SITE BOUNDARY
—··· —	GUADALUPE RIVER
▒▒▒	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✵	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
● **SB7+050E**	SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTES:
Locations are approximate.

Borings will be attempted along Parcel APN 97-01-038. However, the location of the PG&E gas line may require the borings to be placed on District Access Road.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 2," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
CITY OF SANTA CLARA

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-04.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE:
11-22-99

SCALE:
1:120

DRAWING NO.
4.3.4

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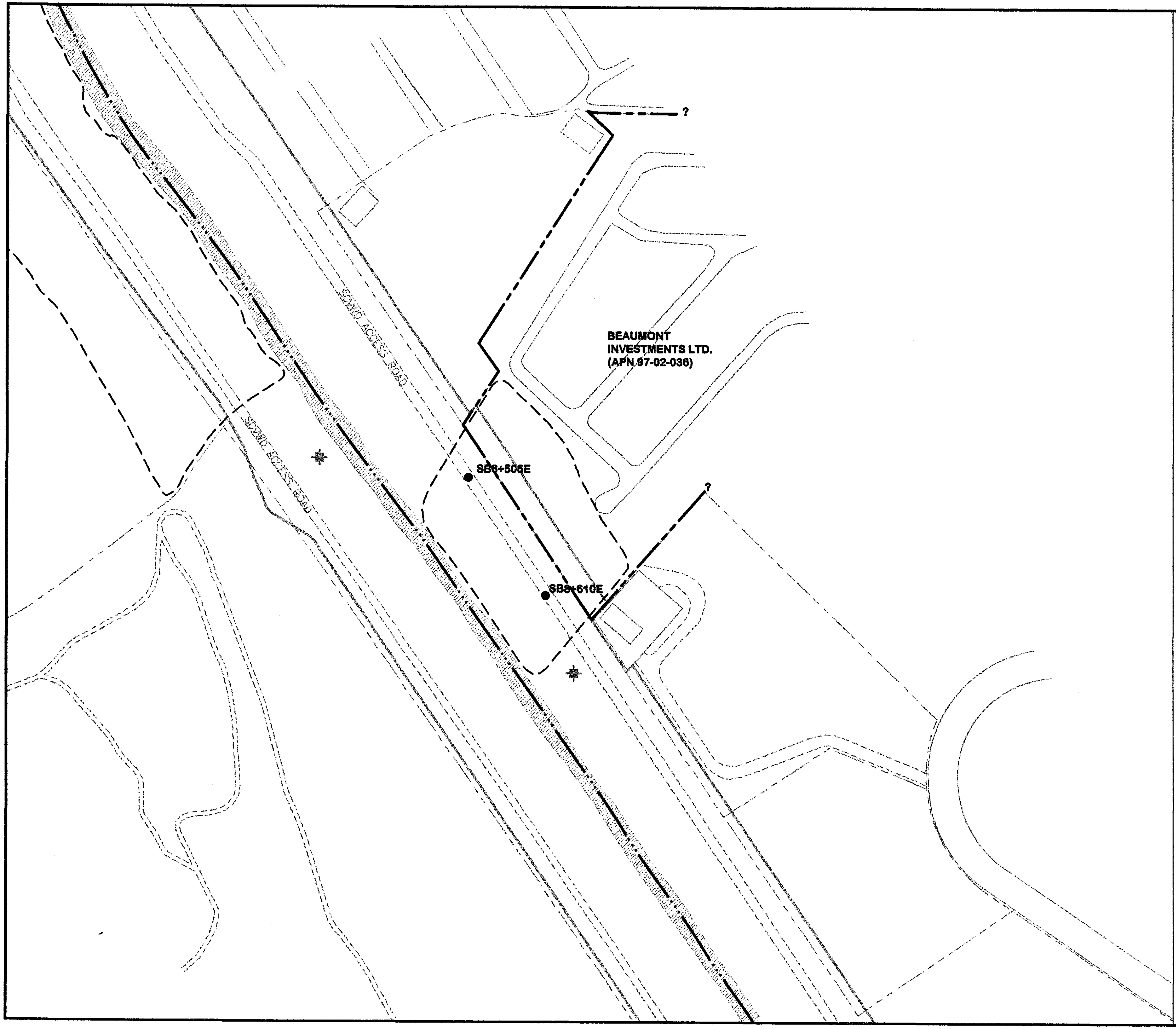

LEGEND

— - - — SITE BOUNDARY

—···— GUADALUPE RIVER

PROJECT LIMITS

— — — — ARCHEOLOGICAL SITE BOUNDARY

DRAIN OUTFALL

● **SB7+050E** SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)

SCVWD SANTA CLARA VALLEY WATER DISTRICT

NOTES:
Locations are approximate.

Permission to enter was not granted for this property. Soil borings will be placed on District Access Road.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 3," dated 1-10-97.

NO.	REVISION	BY	DATE
△			
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△			
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SITE INVESTIGATION
LEVEE ADJACENT TO
BEAUMONT INVESTMENTS CO.

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-05.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.3.5**

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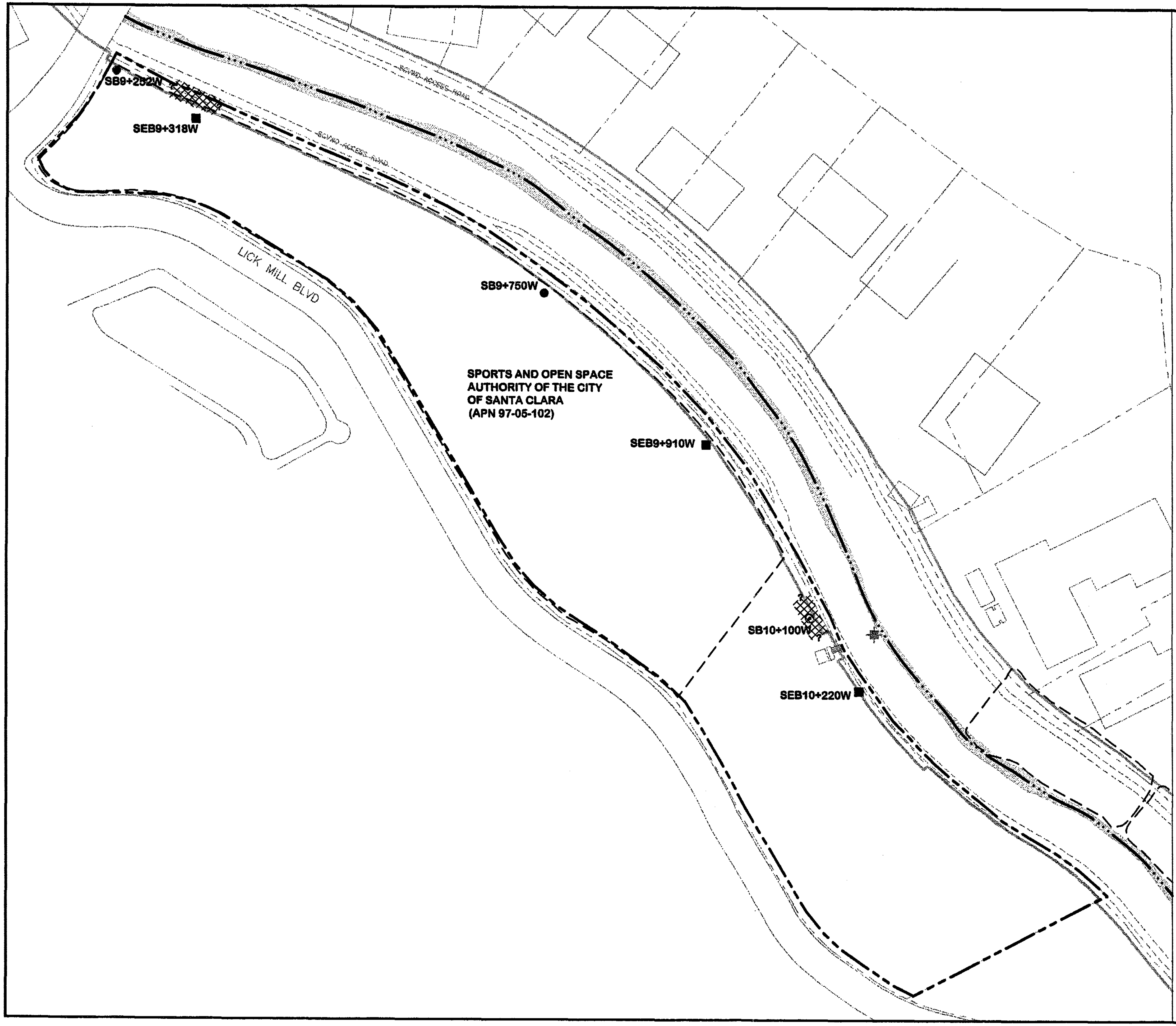


LEGEND

— - - — SITE BOUNDARY

—···— GUADALUPE RIVER

PROJECT LIMITS

— — — — ARCHEOLOGICAL SITE BOUNDARY

DRAIN OUTFALL

◉ SB7+105E SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)

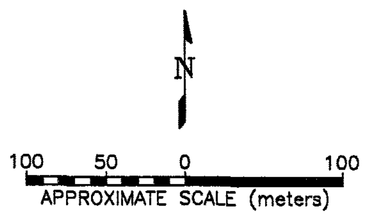
● SB7+050E SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)

■ SEB7+010E COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem Auger)

SCVWD SANTA CLARA VALLEY WATER DISTRICT

▨ AREA IMPACTED BY CHEMICALS IN EXCESS OF REGUALTION CRITERIA (SEE TEXT)

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 4," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF SANTA CLARA

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-06.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 12-8-00

SCALE: SEE BAR SCALE

DRAWING NO. **4.3.6**

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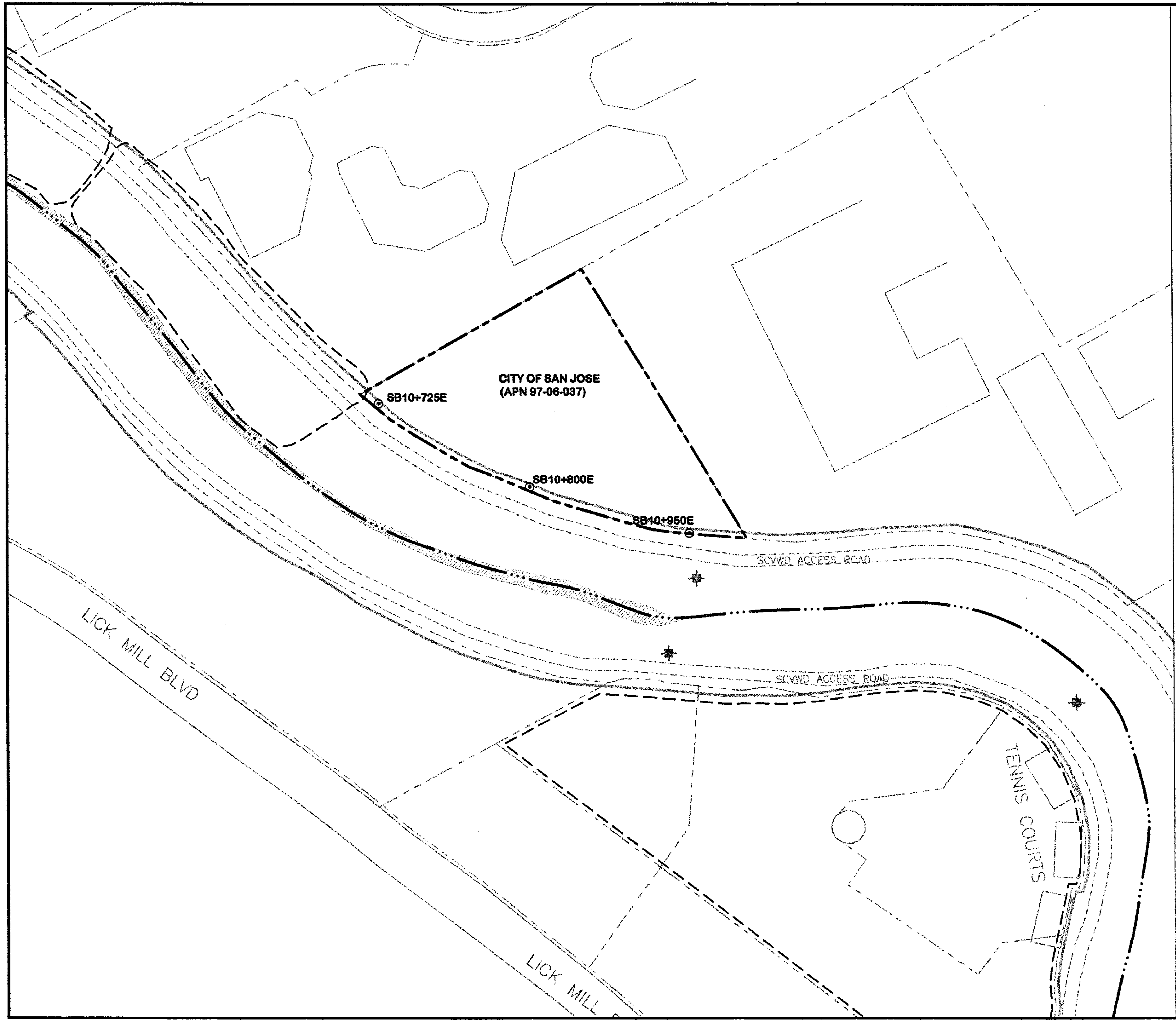

LEGEND

— - - —	SITE BOUNDARY
—···—	GUADALUPE RIVER
▨	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
⊙ SB7+105E	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 5," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
CITY OF SAN JOSE
(APN 97-06-037)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001		ACAD FILE: 12305801\4_3-07.dwg
DRAWN BY: LGS/PD	CHECKED BY: CJK	DESIGNED BY: GC

DATE: 11-22-99

SCALE: 1:80

DRAWING NO.
4.3.7

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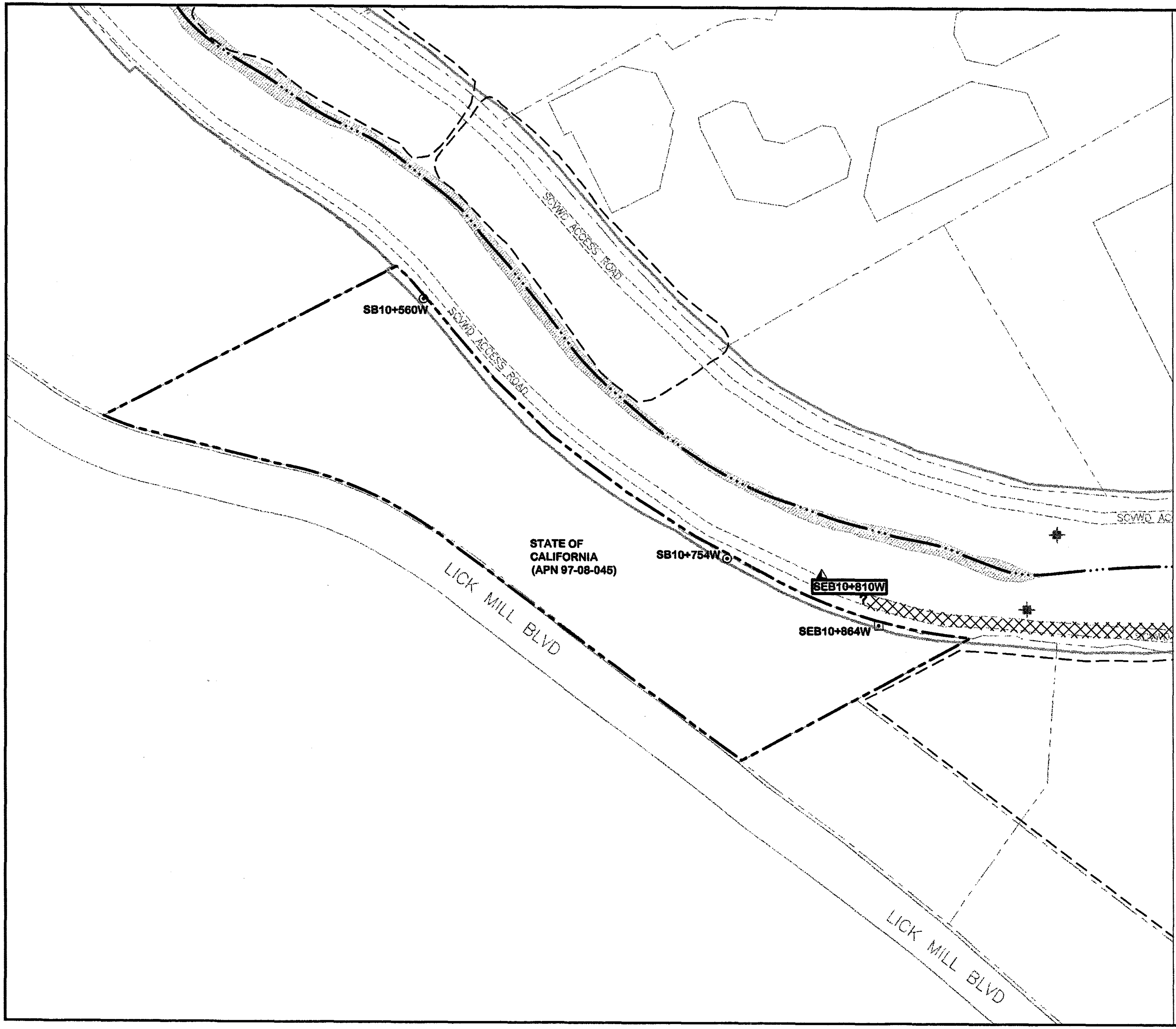

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✸	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
⊡ **SEB7+010E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
▲ **SEB7+010E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
☒	APPROXIMATE AREA OF VOC/SVOC AFFECTED GROUNDWATER

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 5," dated 1-10-97.

NO.	REVISION	BY	DATE

SITE INVESTIGATION
STATE OF CALIFORNIA
(APN 97-08-045)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_3_08.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE:
v

SCALE:
SEE BAR SCALE

DRAWING NO.
4.3.8

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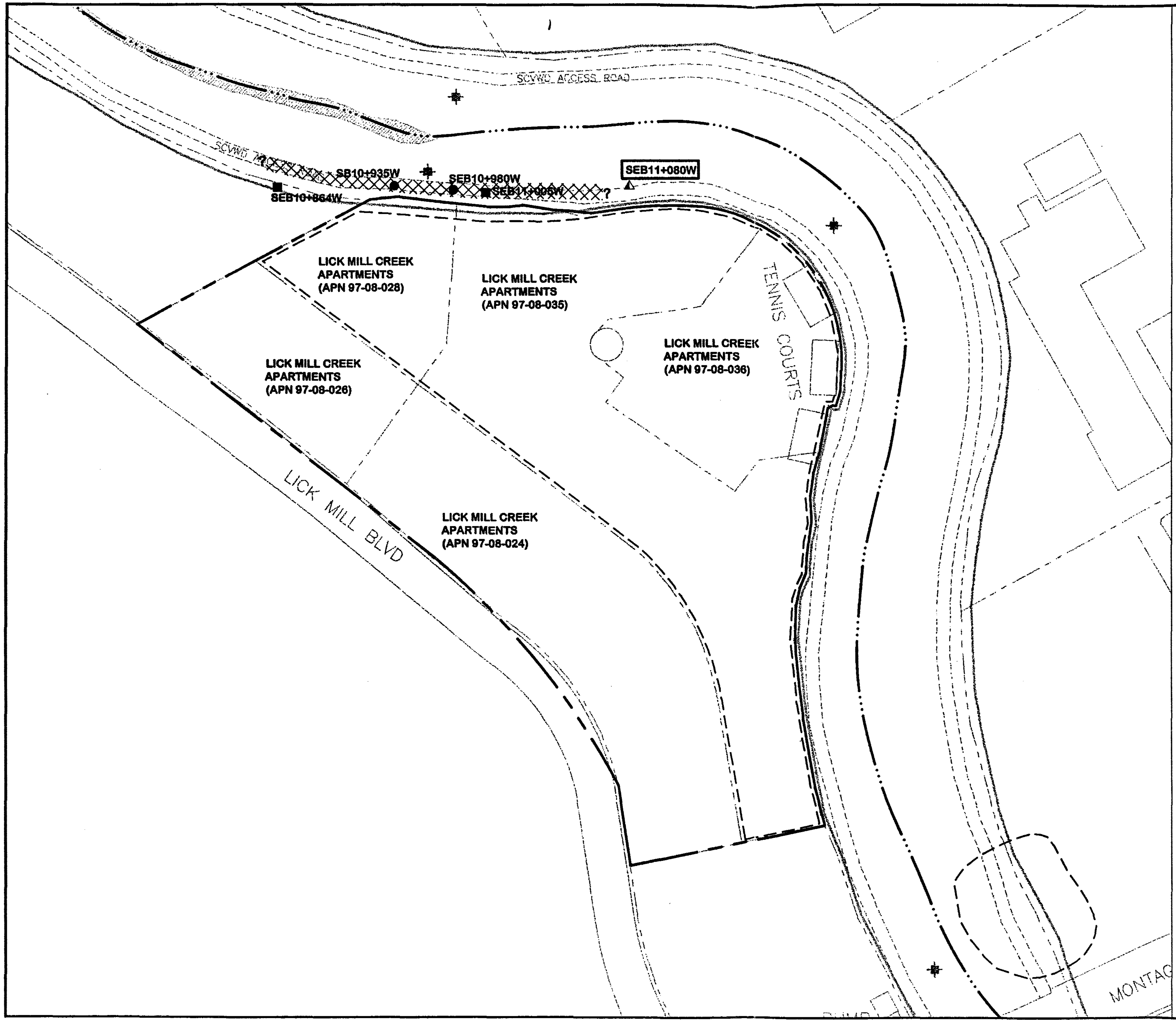
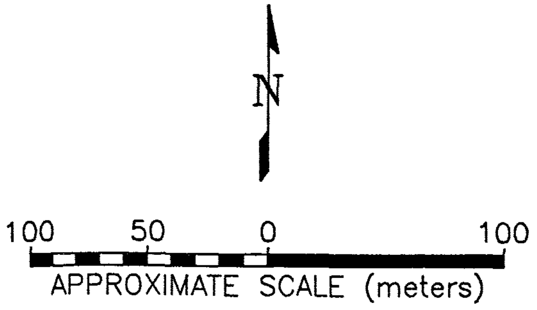

SCVWD ACCESS ROAD
SCVWD
SB10+935W
SEB10+980W
SEB11+005W
SEB11+080W
SEB10+864W
?
LICK MILL CREEK APARTMENTS (APN 97-08-028)
LICK MILL CREEK APARTMENTS (APN 97-08-035)
LICK MILL CREEK APARTMENTS (APN 97-08-036)
TENNIS COURTS
LICK MILL CREEK APARTMENTS (APN 97-08-026)
LICK MILL CREEK APARTMENTS (APN 97-08-024)
LICK MILL BLVD
MONTAG

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
● SB10+935W	SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem Auger)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
▲ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▩	APPROXIMATE EXTENT OF VOC AFFECTED GROUNDWATER IN THE PROJECT AREA

NOTES:
Locations are approximate.

Soil/Embankment boring SEB10+864W will serve three purposes: (1) investigation of State of California property; (2) assessment of groundwater mitigation from Lickmill Creek Apartment property; and (3) embankment soil assessment.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 6," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
LEVEE ADJACENT TO
LICK MILL CREEK APARTMENTS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_3-09.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. 4.3.9

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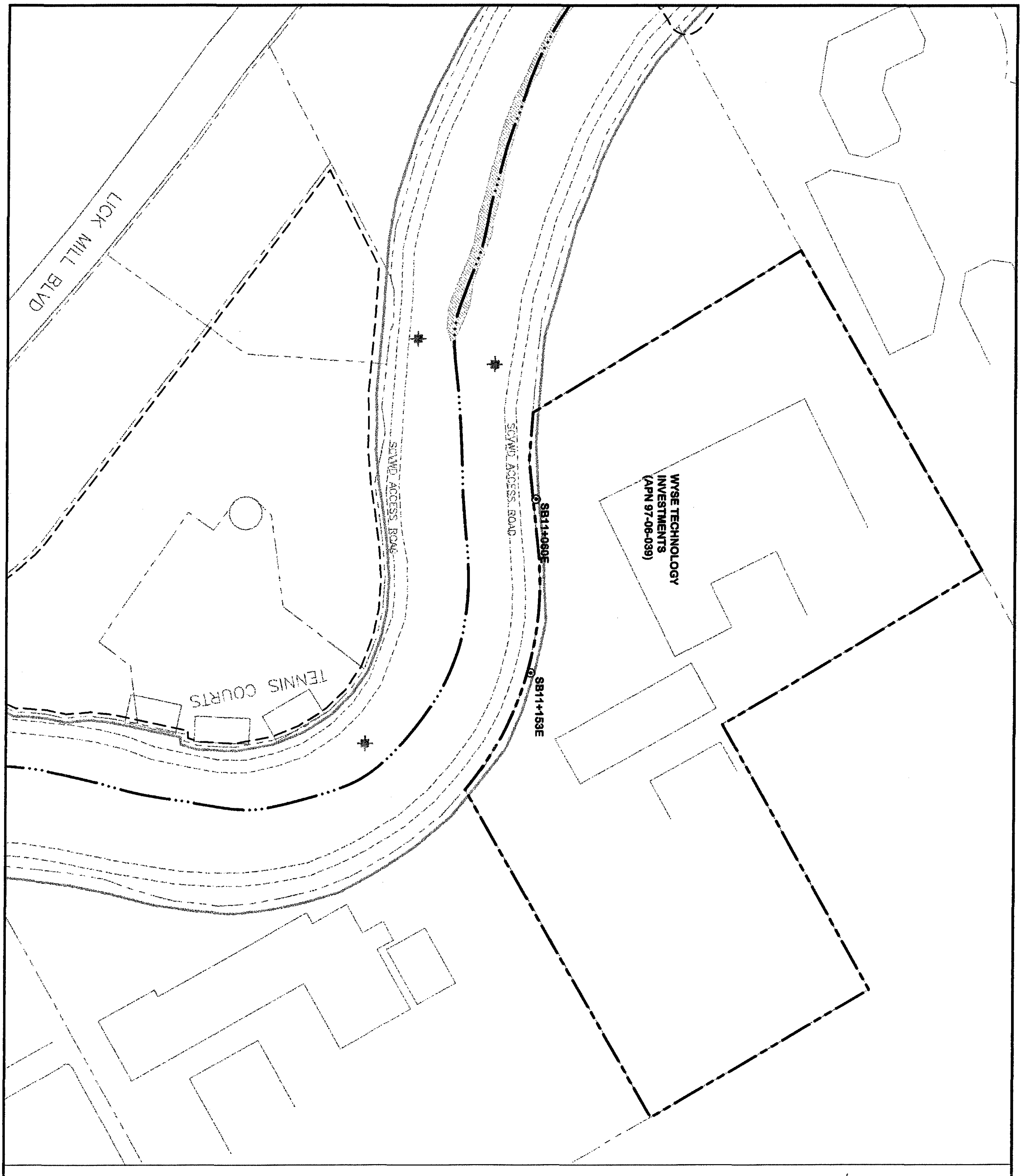
DATE DRAWING PLOTTED: 12-8-00



LEGEND

- ▬ ▬ ▬ SITE BOUNDARY
- ▬ ··· ▬ GUADALUPE RIVER
- ▨ PROJECT LIMITS
- – – – – ARCHEOLOGICAL SITE BOUNDARY
- ✱ DRAIN OUTFALL
- ⊙ **SB7+105E** SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
- SCVWD SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 6," dated 1-10-97.

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DRAWING NO. **4.3.10**

SCALE: 1:80

DATE: 11-22-99

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-10.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

SITE INVESTIGATION
WYSE TECHNOLOGY INVESTMENTS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

NO.	REVISION	BY	DATE
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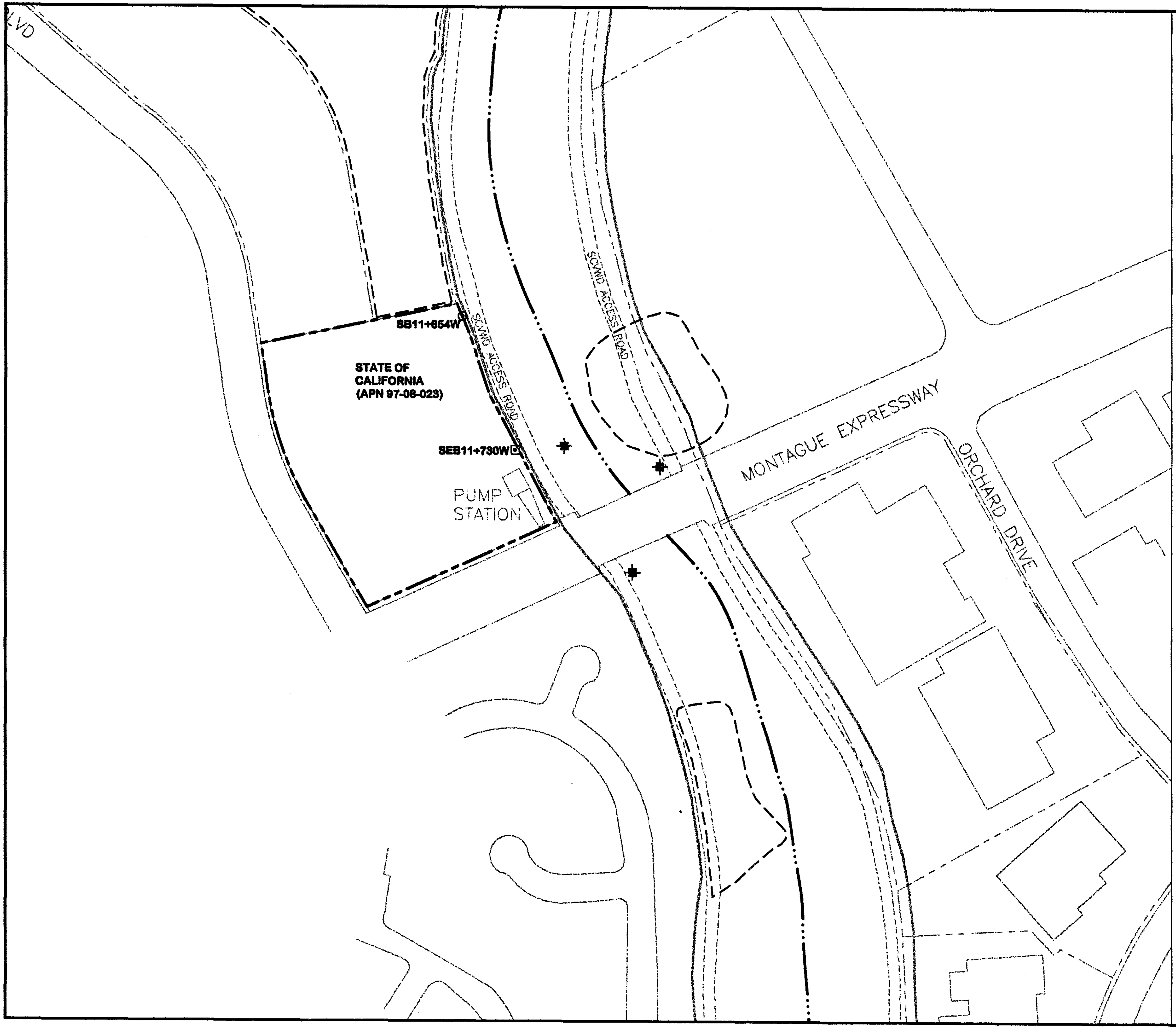

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER
▬▬▬	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
⦿ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
⊡ **SEB7+140E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Geoprobe Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 6," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
STATE OF CALIFORNIA
(APN 97-08-023)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-011.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO.
4.3.11

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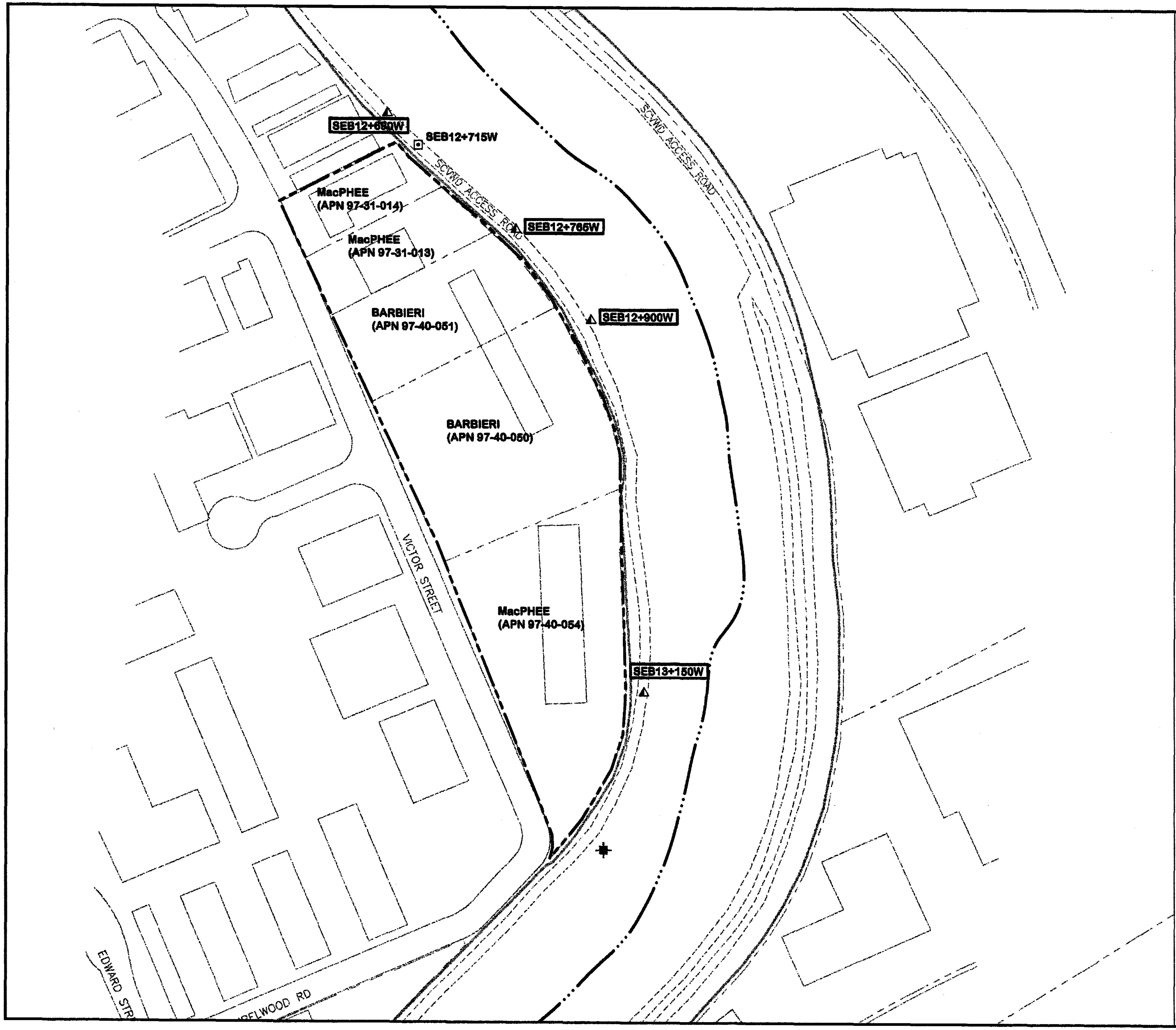


LEGEND

— — — SITE BOUNDARY

—···— GUADALUPE RIVER CHANNEL

—— PROJECT LIMITS

- - - - - ARCHEOLOGICAL SITE BOUNDARY

✱ DRAIN OUTFALL

▣ **SEB7+140E** COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)

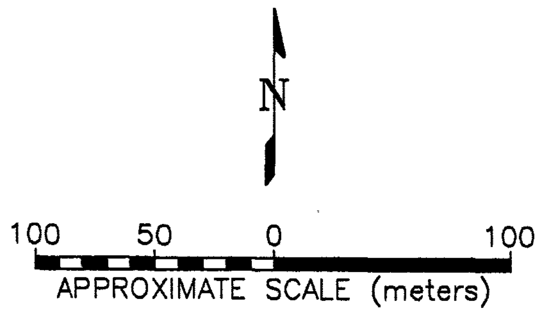
SCVWD SANTA CLARA VALLEY WATER DISTRICT

▲ **SEB7+010E** COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)

SEB7+010E SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT

NOTES:
Locations are approximate.

No access to this property. Soil borings will be placed on District Access Road.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheets 7 and 8," dated 1-10-97.

NO.	REVISION	BY	DATE

SITE INVESTIGATION
LEVEE ADJACENT TO
MacPHEE/BARBIERI

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4.3-12.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 11-17-00
SCALE: SEE BAR SCALE
DRAWING NO.
4.3.12

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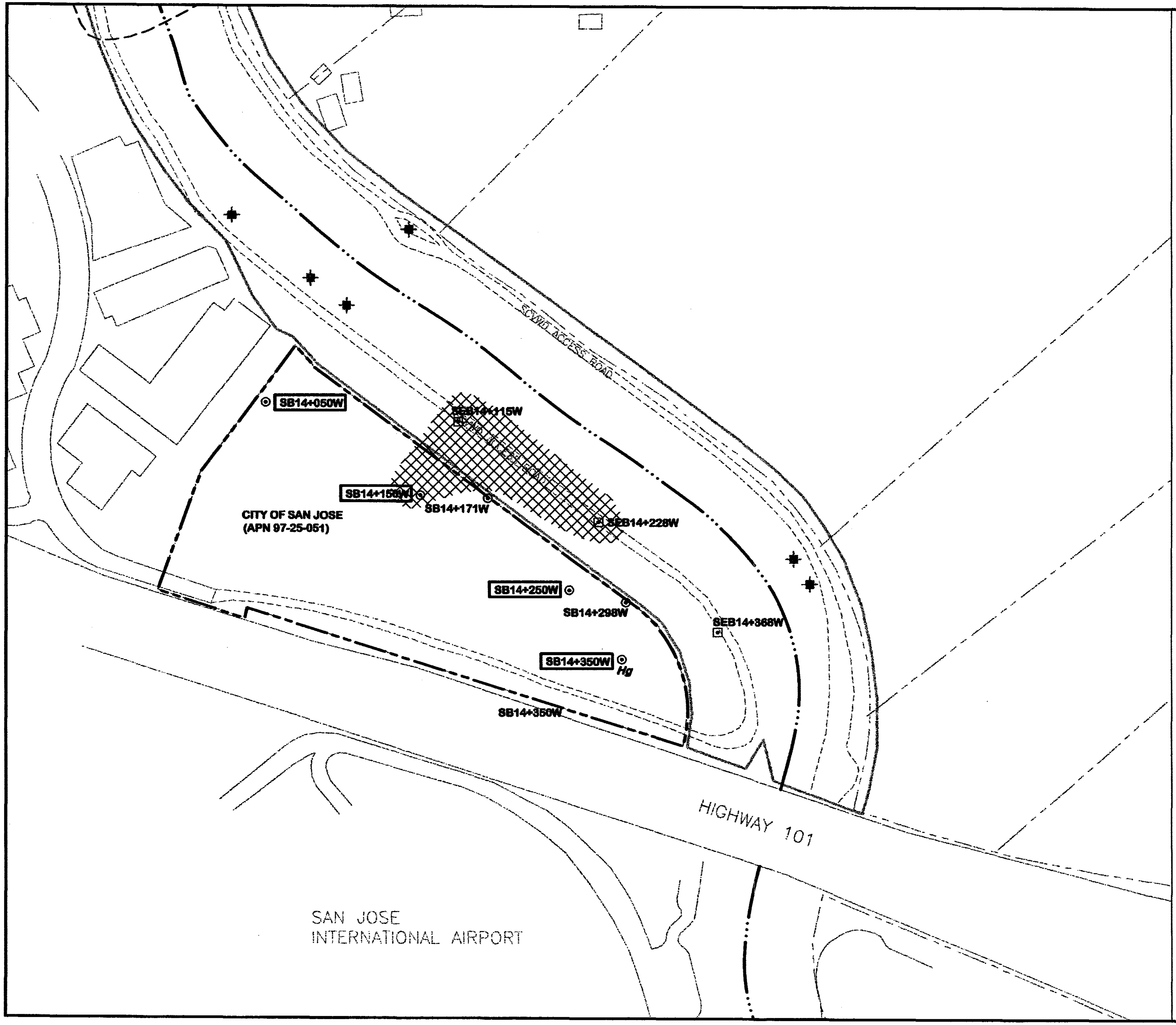
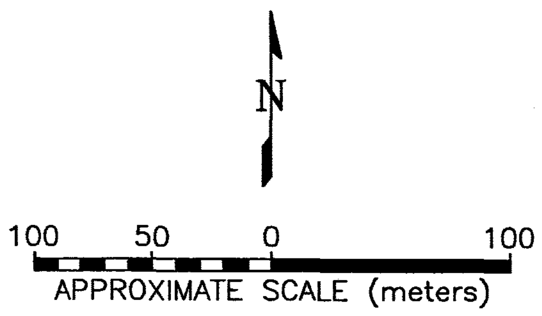


LEGEND

— - —	SITE BOUNDARY
—···—	GUADALUPE RIVER CHANNEL
═	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
⊙ SB7+105E	SOIL BORING (Direct Push in areas with no Archeological concerns)
⊡ SEB7+140E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	AREA WITH TOTAL SUM OF 4,4–DDT, 4,4–DDD, AND 4,4–DDE IN EXCESS OF TTLCs
⊙ *Hg*	BORING WITH MERCURY IN EXCESS OF TTLC

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 9," dated 1–10–97.

NO.	REVISION	BY	DATE

SITE INVESTIGATION
CITY OF SAN JOSE
(APN 97-25-051)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO. 12–305801–900
ACAD FILE: 4_3–13.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12–6–00
SCALE: SEE BAR SCALE
DRAWING NO. **4.3.13**

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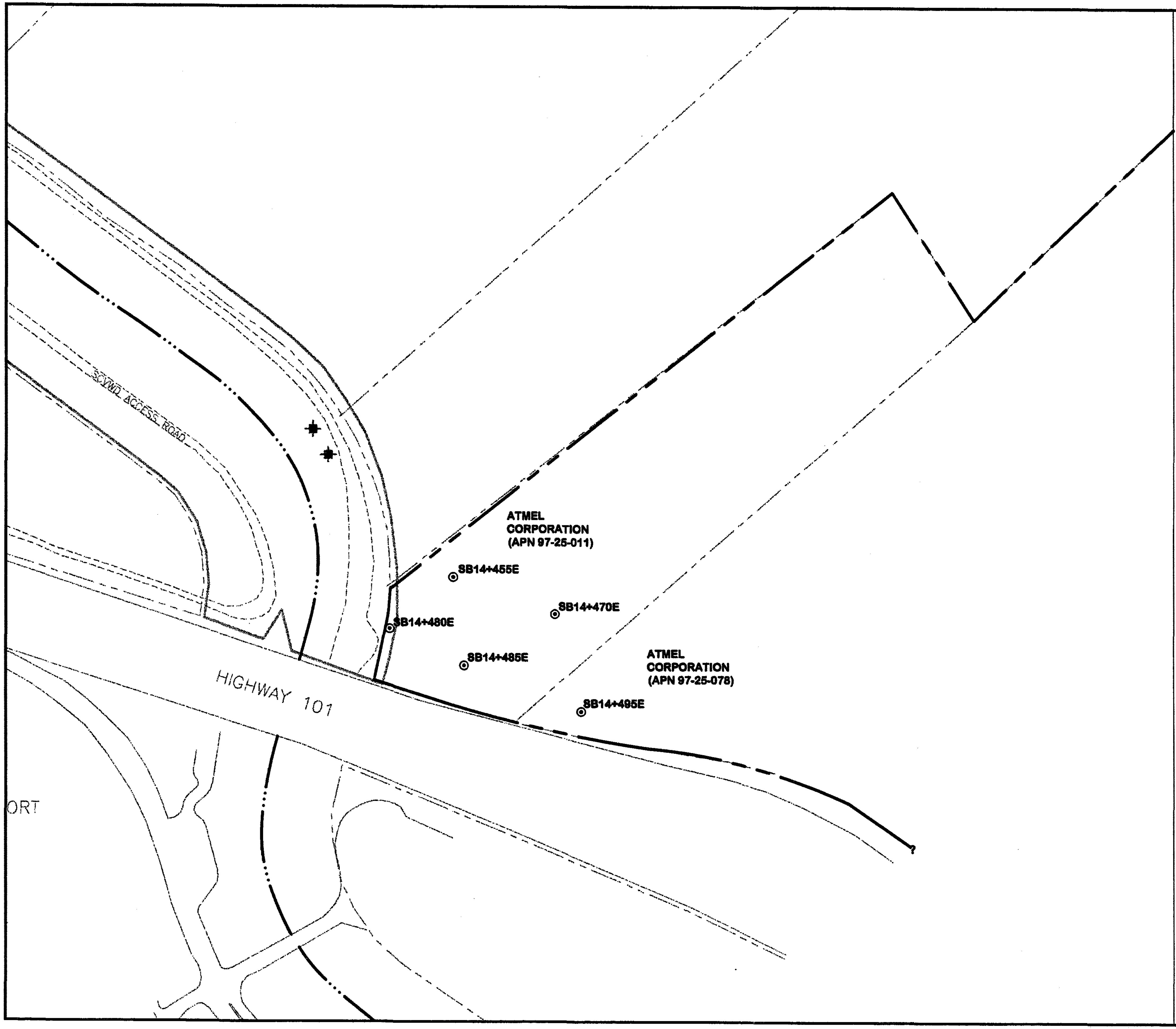

LEGEND

— — —	SITE BOUNDARY
—·· · ——	GUADALUPE RIVER
▨	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
◉ SB7+105E	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
ATMEL CORPORATION

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_3-14.dwg
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CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.3.14**

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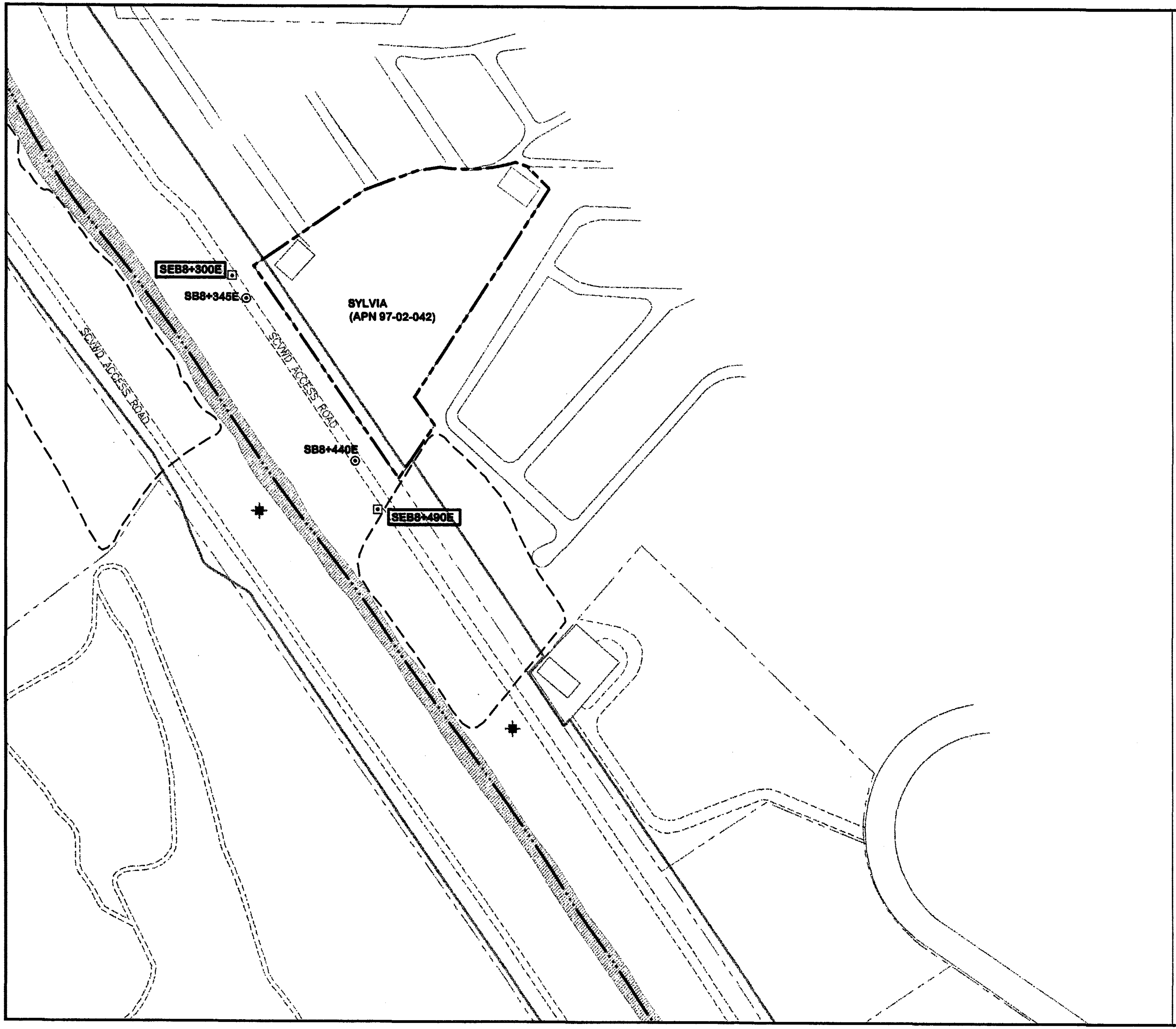

LEGEND

— — —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
⊡ **SEB7+140E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
▲ **SEB7+010E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 3," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
LEVEE ADJACENT TO SYLVIA
(APN 97-02-042)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4.4-01.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00

SCALE: SEE BAR SCALE

DRAWING NO.
4.4.1

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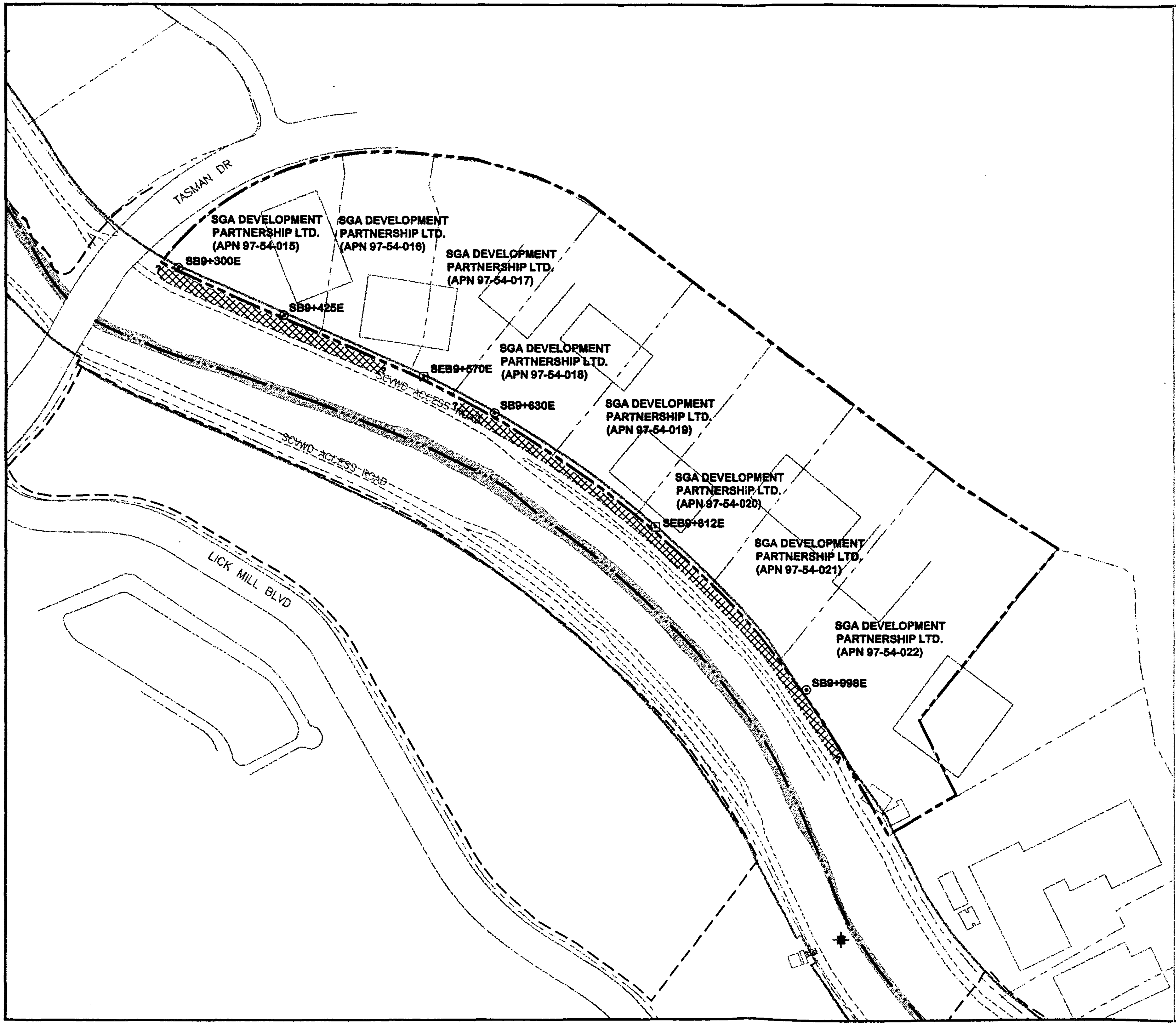
TASMAN DR
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-015)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-016)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-017)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-018)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-019)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-020)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-021)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-022)
SB9+300E
SB9+425E
SEB9+570E
SB9+630E
SEB9+812E
SB9+998E
SCVWD ACCESS ROAD
SCVWD ACCESS ROAD
LICK MILL BLVD
N

LEGEND

— — — SITE BOUNDARY

—··· — GUADALUPE RIVER

PROJECT LIMITS

- - - - ARCHEOLOGICAL SITE BOUNDARY

✦ DRAIN OUTFALL

⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
⊡ **SEB7+140E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Geoprobe Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
▨	APPROXIMATE AREA WITH POTENTIAL PESTICIDE IMPACTS

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 4," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SGA DEVELOPMENT PARTNERSHIP

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-02.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 12-8-00
SCALE: 1:120
DRAWING NO. **4.4.2**

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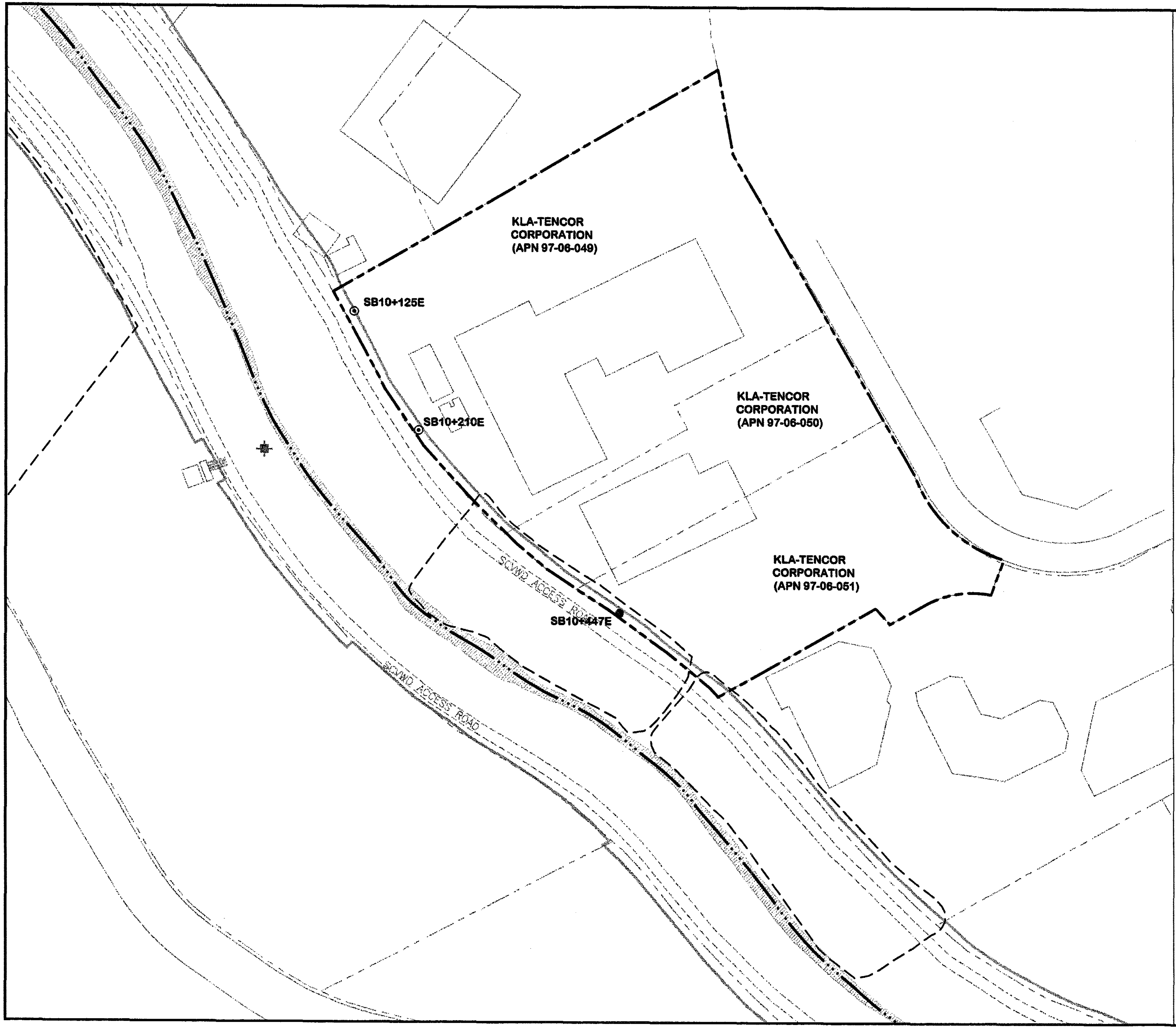
KLA-TENCOR CORPORATION (APN 97-06-049)
KLA-TENCOR CORPORATION (APN 97-06-050)
KLA-TENCOR CORPORATION (APN 97-06-051)
SB10+125E
SB10+210E
SB10+447E
SCVWD ACCESS ROAD
SCVWD ACCESS ROAD
N

LEGEND

— – – —	SITE BOUNDARY
—··· —	GUADALUPE RIVER
▨	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
● **SB7+050E**	SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 5," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
KLA-TENCOR CORPORATION

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-03.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99

SCALE: 1:80

DRAWING NO. **4.4.3**

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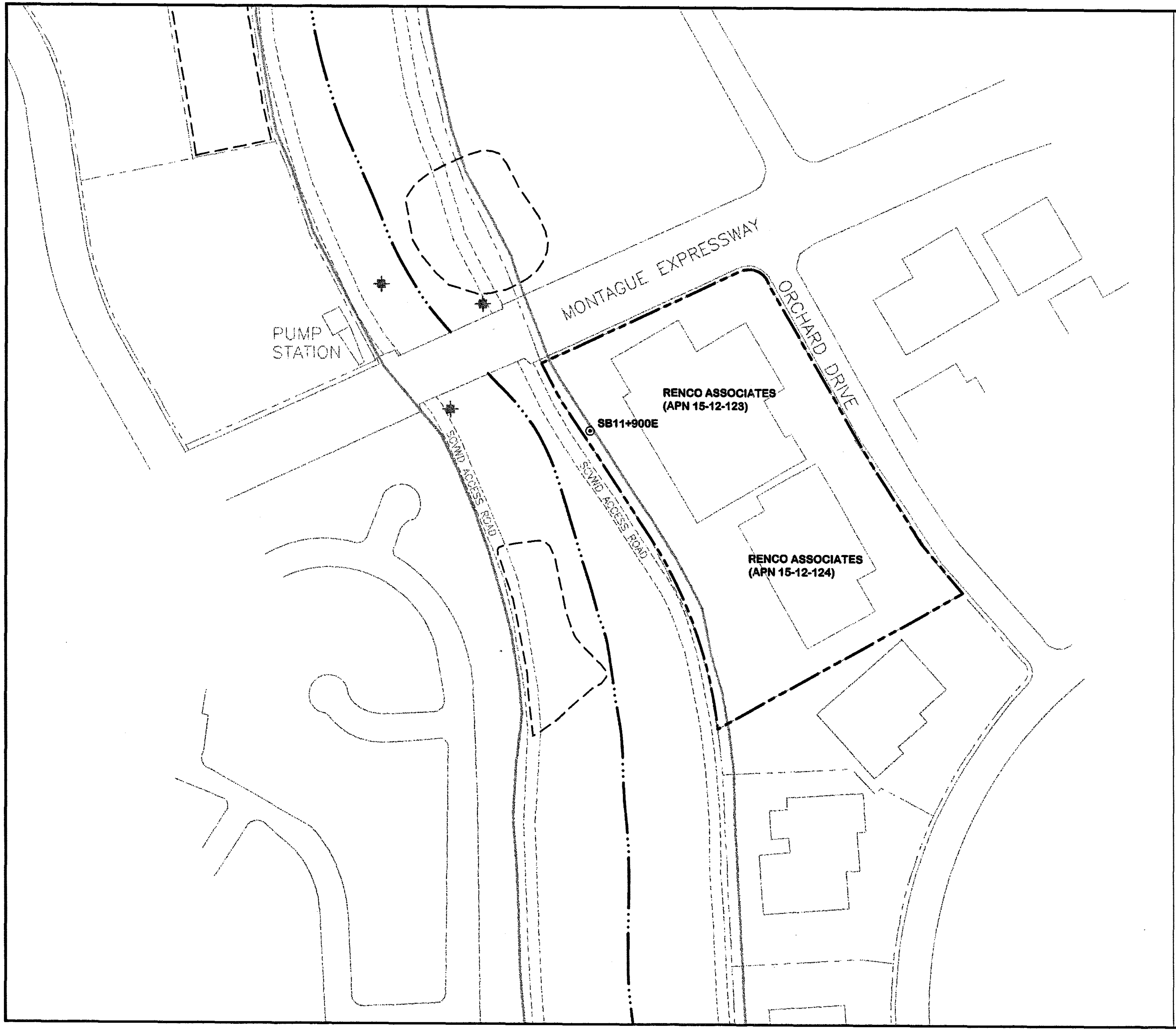

LEGEND

— – – —	SITE BOUNDARY
—··· —	GUADALUPE RIVER
▨	PROJECT LIMITS
– – – – –	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 6," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
RENCO ASSOCIATES
(APN 97-12-123 & -124)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:

SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305B01\4_4-04.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.4.4**

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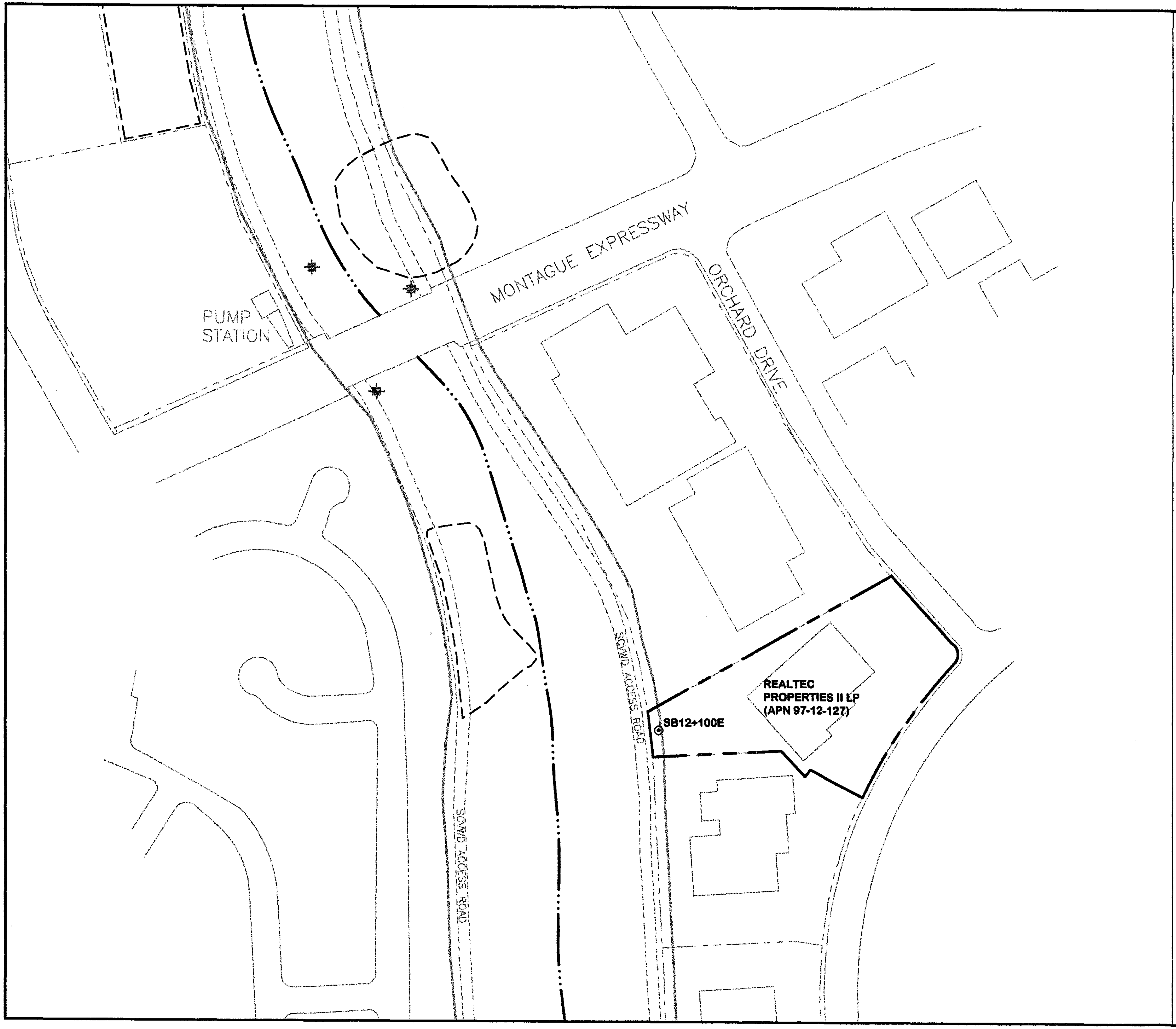

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER
▬	PROJECT LIMITS
– – – – –	ARCHEOLOGICAL SITE BOUNDARY
✵	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 7," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
REALTEC PROPERTIES II LP

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-05.dwg
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SCALE: 1:80
DRAWING NO. **4.4.5**

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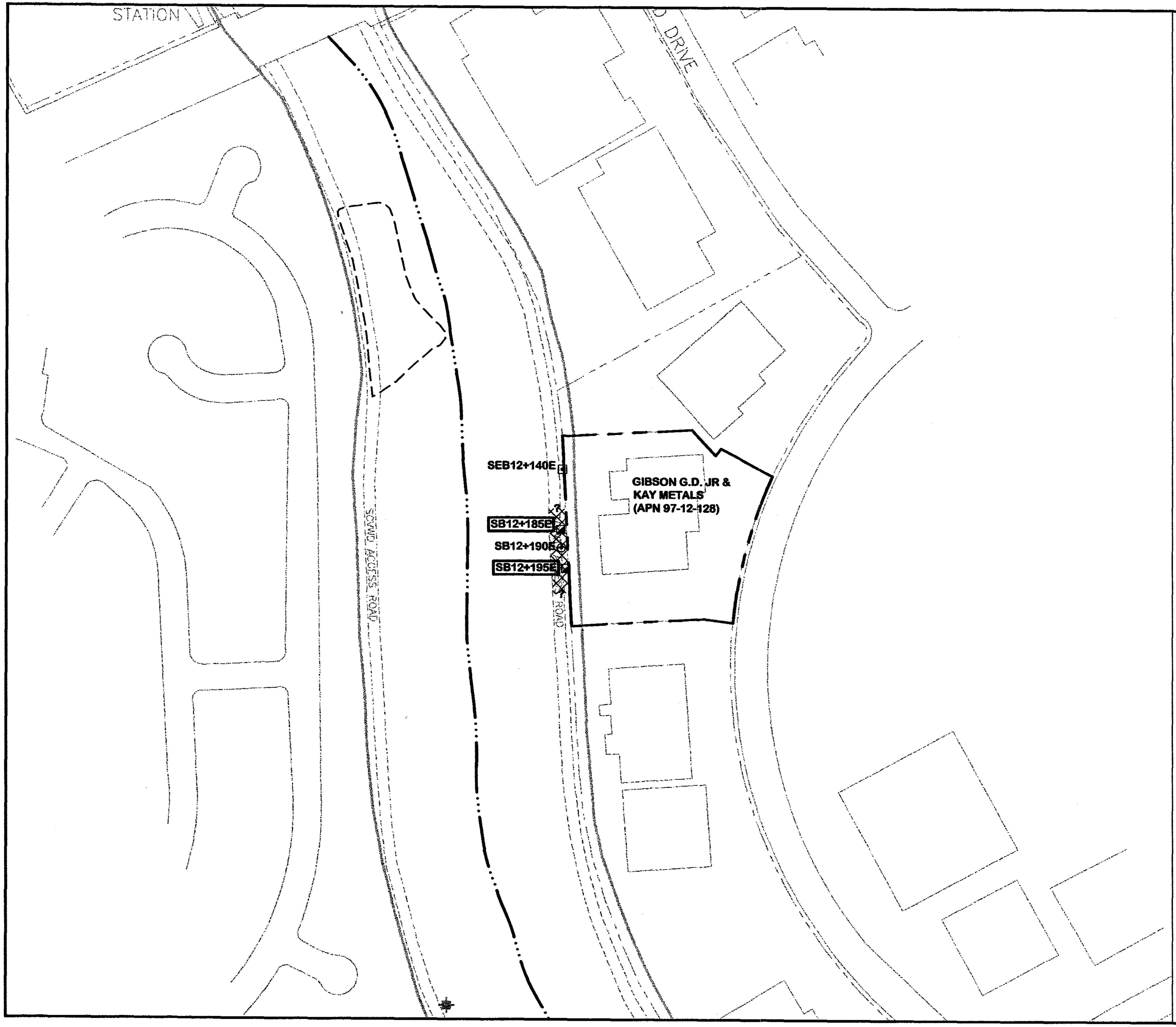

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▬	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
⊙ SB7+105E	SOIL BORING (Direct Push in areas with no Archeological concerns)
⊡ SEB7+140E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
◪ SB13+080E	SOIL BORING (installed by Hand Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	AREA WITH PESTICIDES IN EXCESS OF TTLCs

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 7," dated 1-10-97.

NO.	REVISION	BY	DATE

SITE INVESTIGATION
LEVEE ADJACENT TO
GIBSON G.D. JR AND KAY METALS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:
12-305801-900	4_4-06.dwg

DRAWN BY:	CHECKED BY:	DESIGNED BY:
LGS	CHA	CC/KB

DATE: 12-8-00

SCALE: SEE BAR SCALE

DRAWING NO. **4.4.6**

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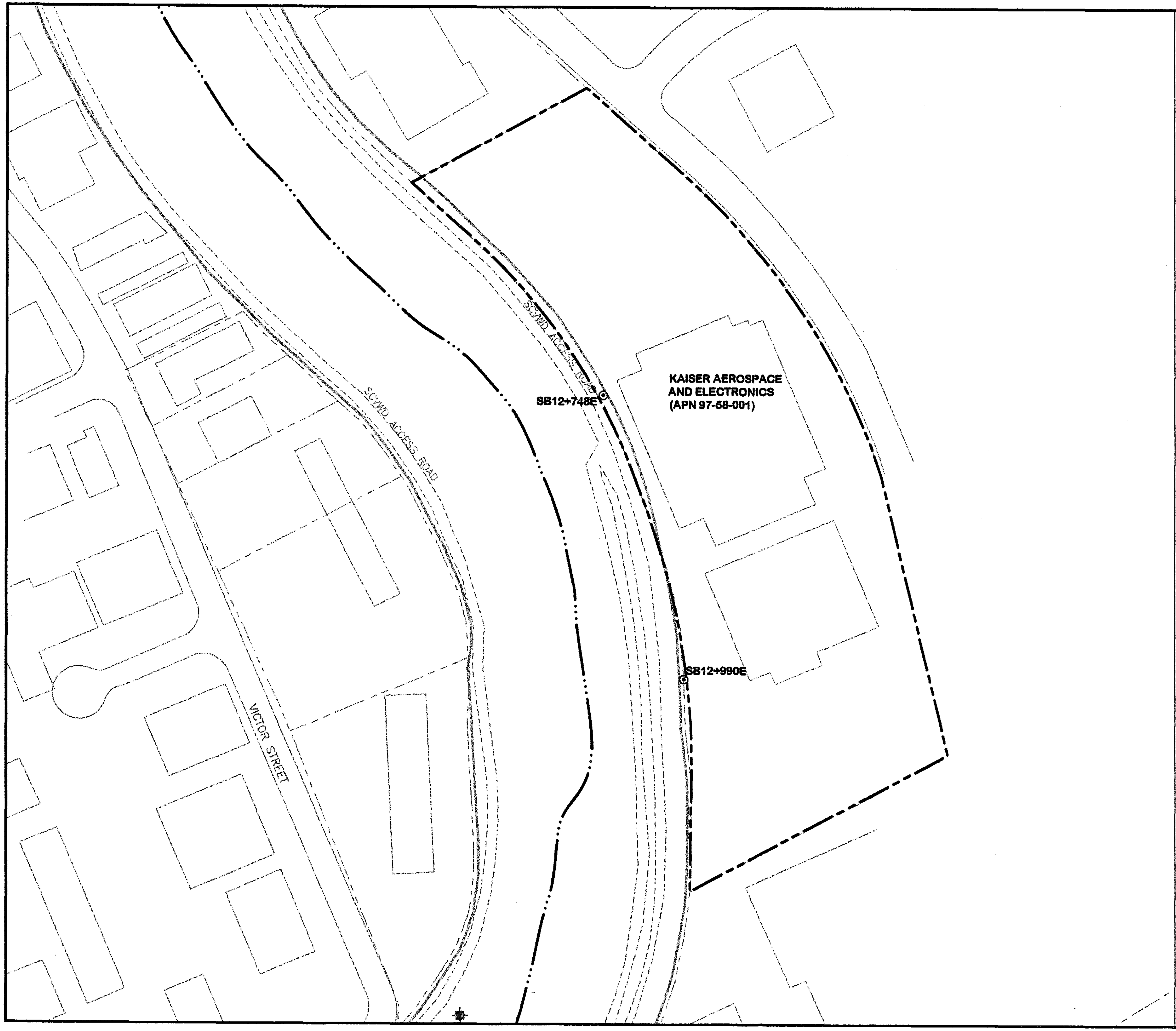

LEGEND

- SITE BOUNDARY
- GUADALUPE RIVER
- PROJECT LIMITS
- ARCHEOLOGICAL SITE BOUNDARY
- DRAIN OUTFALL
- ⊙ **SB7+105E** SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
- SCVWD SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheets 7 and 8," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
KAISER AEROSPACE AND ELECTRONICS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-07.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.4.7**

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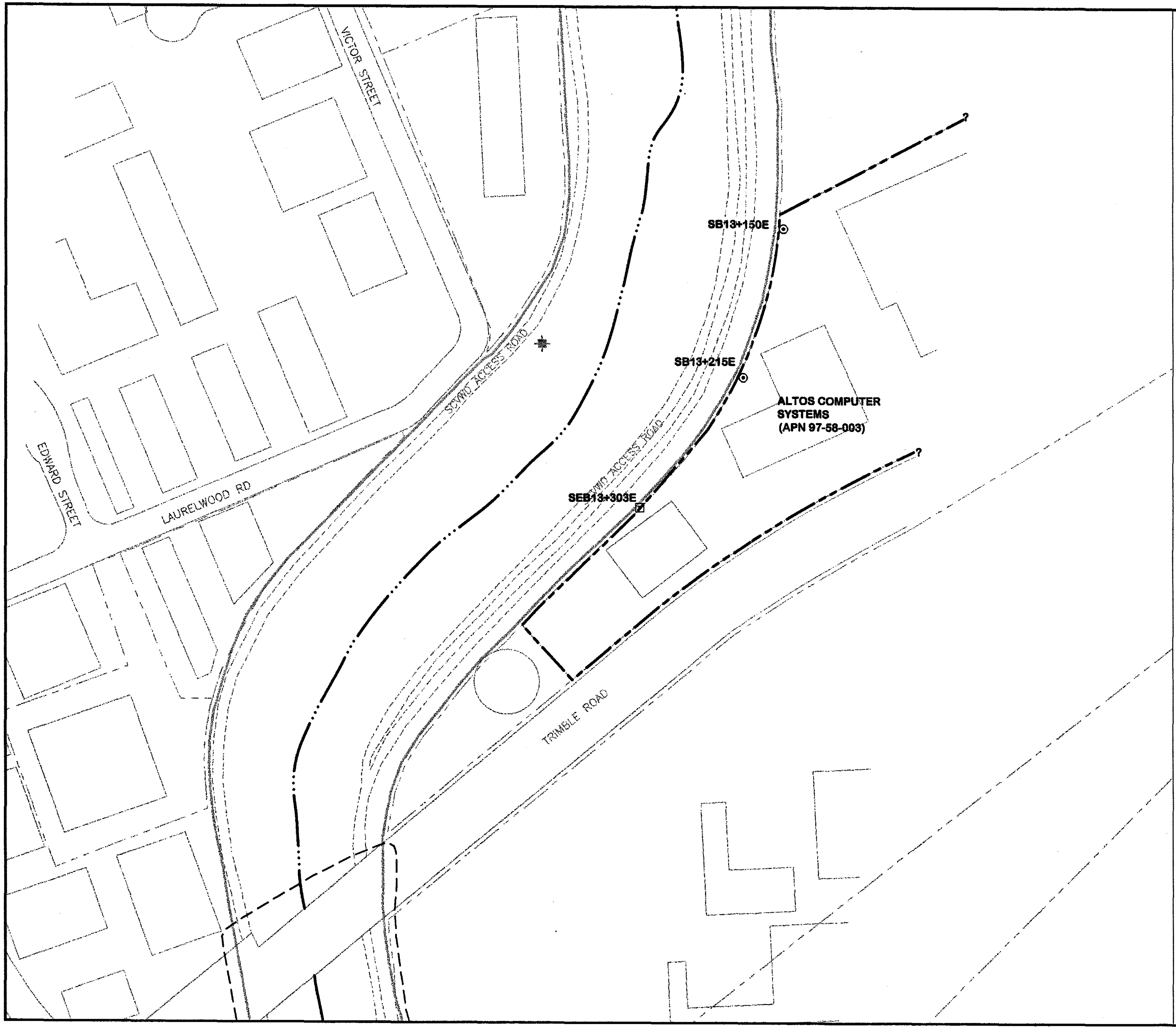

LEGEND

— — —	SITE BOUNDARY
—··· —	GUADALUPE RIVER
▨	PROJECT LIMITS
– – – –	ARCHEOLOGICAL SITE BOUNDARY
✵	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
⊡ **SEB7+140E**	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Geoprobe Direct Push)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 8," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
ALTOS COMPUTER SYSTEMS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-08.dwg
DRAWN BY: LGS/PD
CHECKED BY: CJK
DESIGNED BY: GC

DATE: 11-22-99
SCALE: 1:80
DRAWING NO. **4.4.8**

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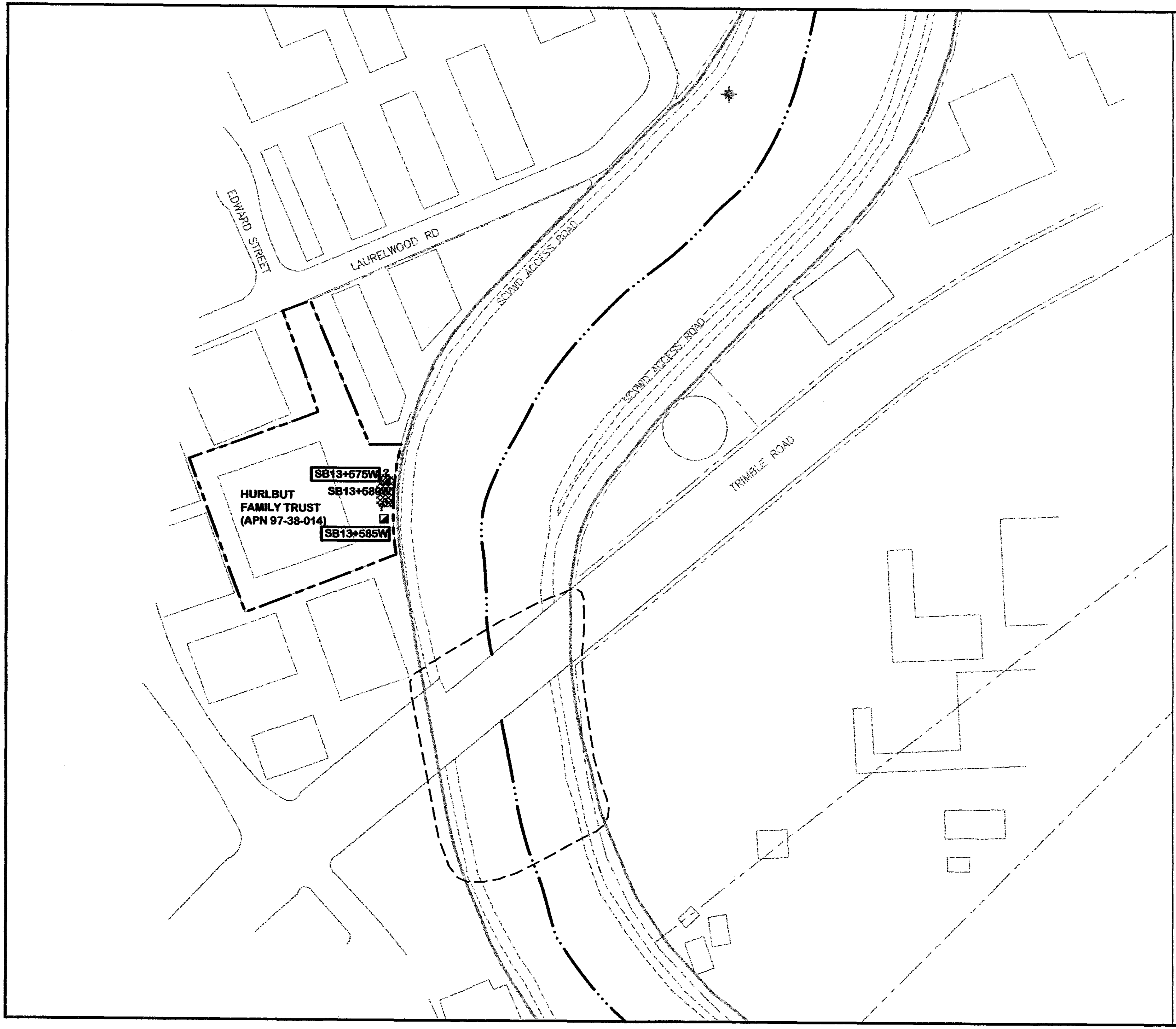

LEGEND

- ━ ━ ━ SITE BOUNDARY
- ━ · · · ━ GUADALUPE RIVER CHANNEL
- ═══ PROJECT LIMITS
- – – – – ARCHEOLOGICAL SITE BOUNDARY
- ✦ DRAIN OUTFALL
- ⦿ SB7+105E SOIL BORING (Direct Push in areas with no Archeological concerns)
- SCVWD SANTA CLARA VALLEY WATER DISTRICT
- ▲ SEB7+010E COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hand Auger)
- ◪ SB13+080E SOIL BORING (installed by Hand Auger)
- **SEB7+010E** SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
- ▨ AREA WITH PESTICIDES IN EXCESS OF TTLCs

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 8," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
LEVEE ADJACENT TO
HURLBUT FAMILY TRUST

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_4-09.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.4.9**

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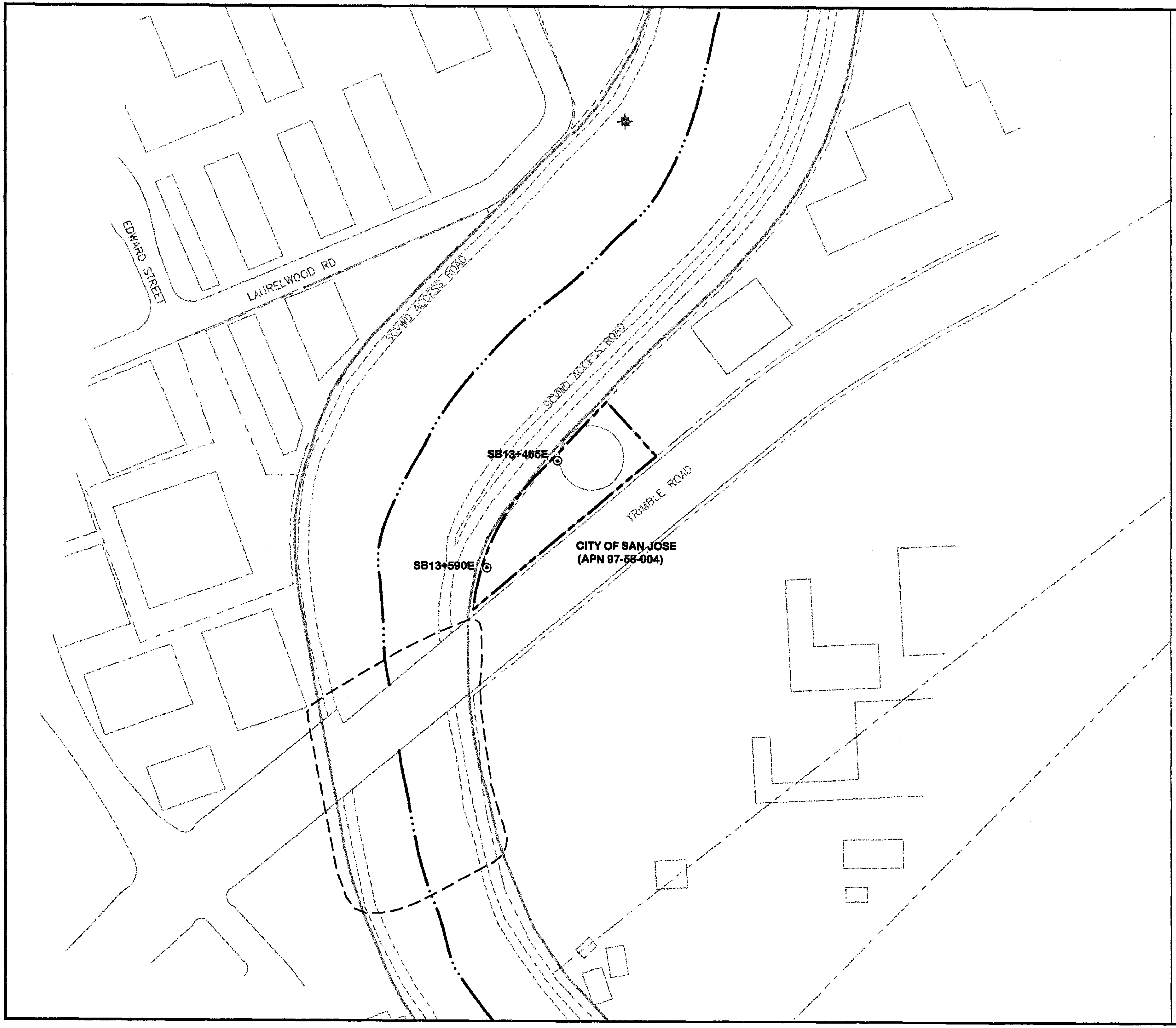

LEGEND

— - - —	SITE BOUNDARY
—···—	GUADALUPE RIVER
═══	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Geoprobe Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 8," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
CITY OF SAN JOSE
(APN 97-58-004)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305800-001
ACAD FILE: 12305801\4_4-10.dwg
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DESIGNED BY:

DATE: 11-22-99
SCALE: 1:80
DRAWING NO.
4.4.10

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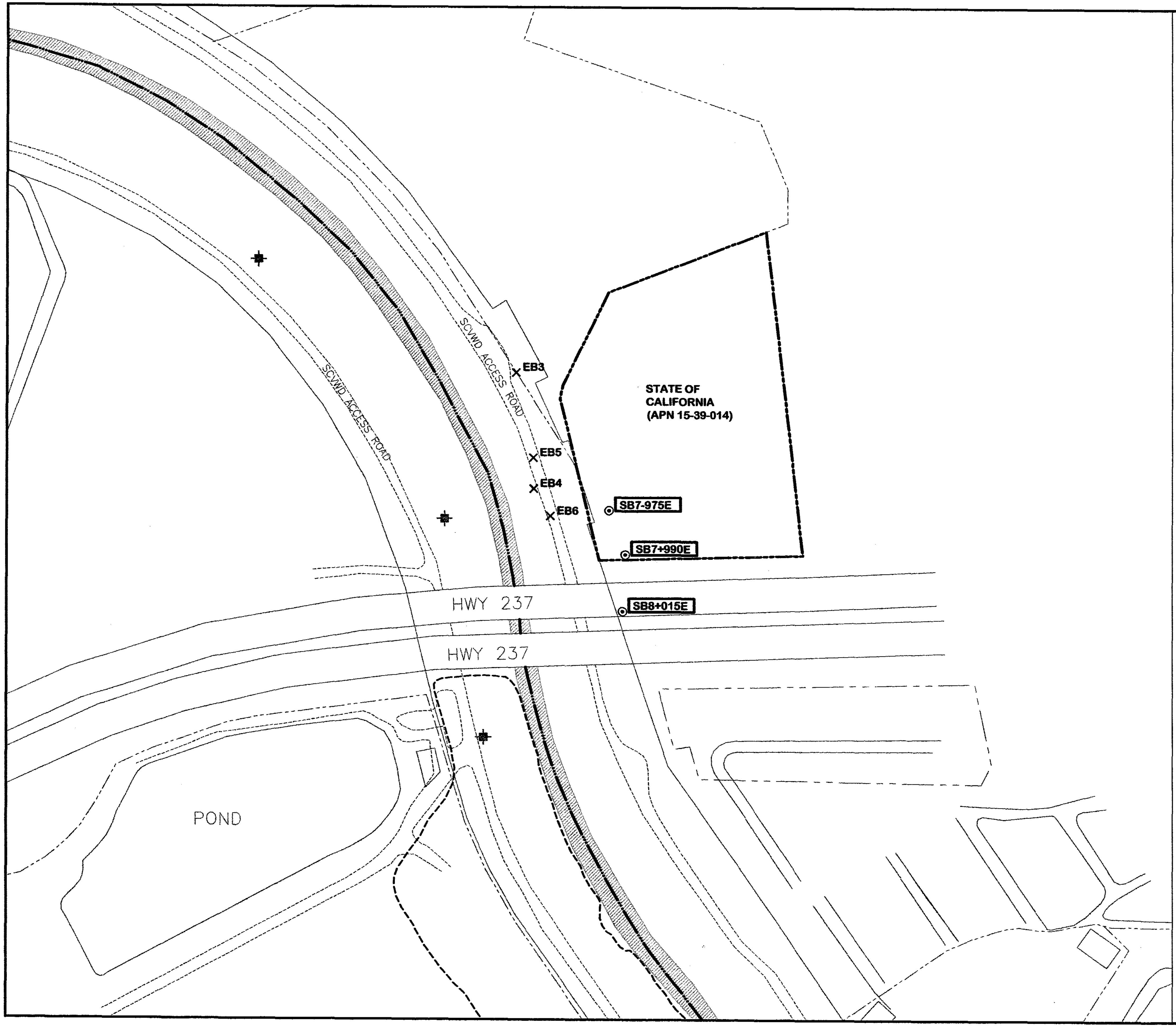

LEGEND

——·——·——	SITE BOUNDARY
——··——··——	GUADALUPE RIVER CHANNEL
————	PROJECT LIMITS
- - - - - - - -	ARCHEOLOGICAL SITE BOUNDARY
✚	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
× **W1**	GEOTECHNICAL SOIL BORING (installed by URS Woodward–Clyde, May 1998)

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 2," dated 1–10–97.

NO.	REVISION	BY	DATE

SITE INVESTIGATION
STATE OF CALIFORNIA
(APN 15-39-014)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO.	ACAD FILE:
12–305801–900	4_5–01.dwg
DRAWN BY: LGS	CHECKED BY: CHA	DESIGNED BY: CC/KB

DATE: 12–8–00

SCALE: SEE BAR SCALE

DRAWING NO.
4.5.1

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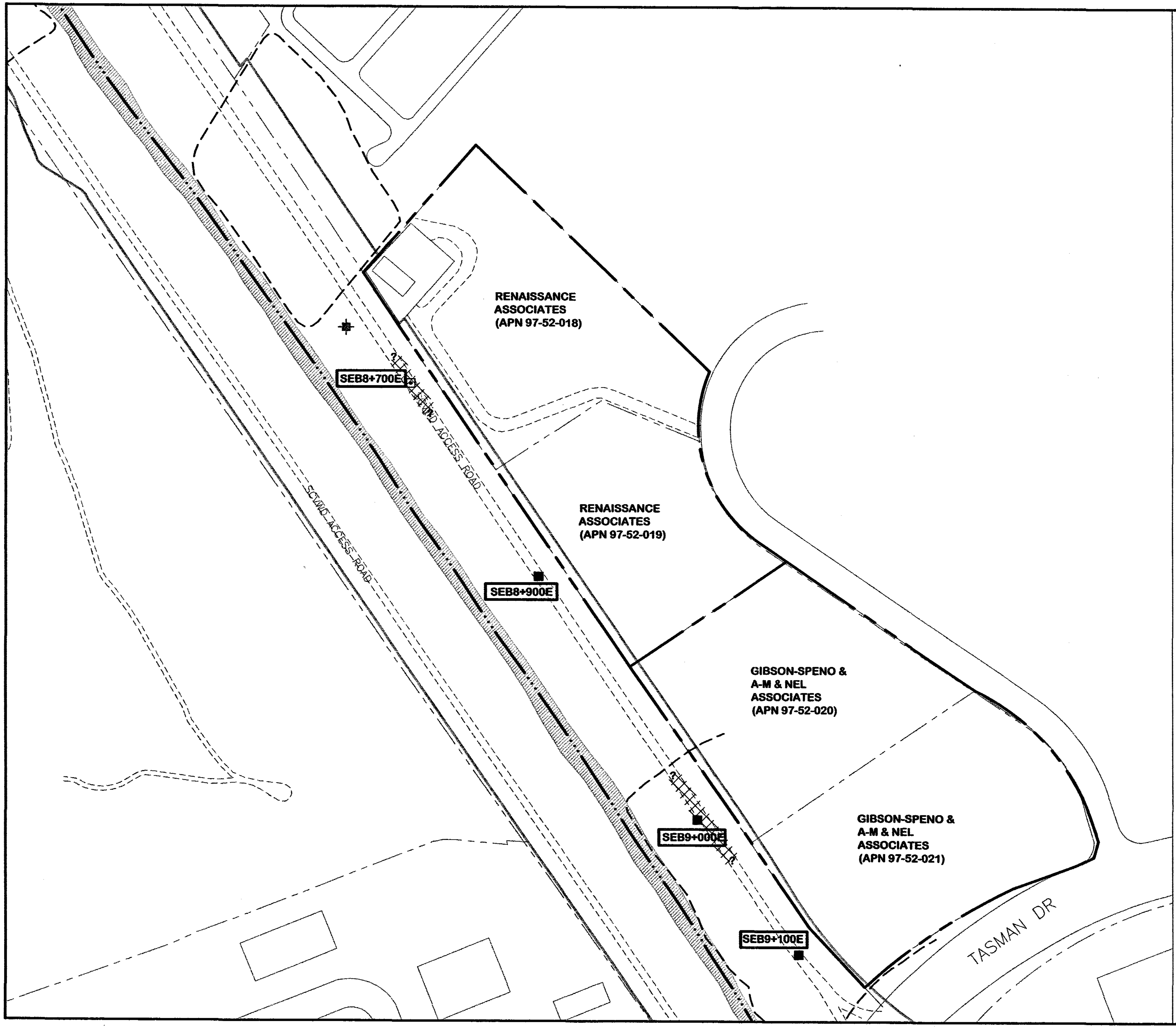
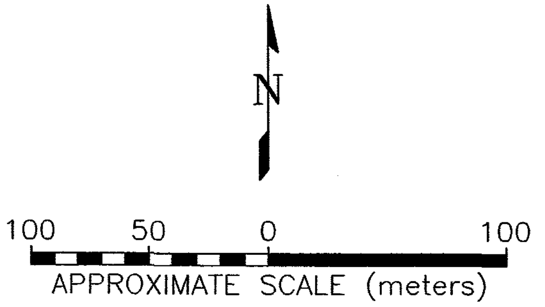

RENAISSANCE ASSOCIATES (APN 97-52-018)
RENAISSANCE ASSOCIATES (APN 97-52-019)
GIBSON-SPENO & A-M & NEL ASSOCIATES (APN 97-52-020)
GIBSON-SPENO & A-M & NEL ASSOCIATES (APN 97-52-021)
SEB8+700E
SEB8+900E
SEB9+000E
SEB9+100E
SCVWD ACCESS ROAD
ACCESS ROAD
TASMAN DR

LEGEND

— — —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
——	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✣	DRAIN OUTFALL
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
▣ SEB7+140E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
■ SEB7+010E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Hollow Stem or Flight Auger)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	AREA WITH PESTICIDES IN EXCESS OF TTLCs

NOTE: Locations are approximate.



APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 3," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
RENAISSANCE ASSOC./
GIBSON-SPENO & A-M & NEL ASSOC

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900	ACAD FILE: 4_5-02.dwg	
DRAWN BY: LGS	CHECKED BY: CHA	DESIGNED BY: CC/KB

DATE:
05-09-01

SCALE:
SEE BAR SCALE

DRAWING NO.
4.5.2

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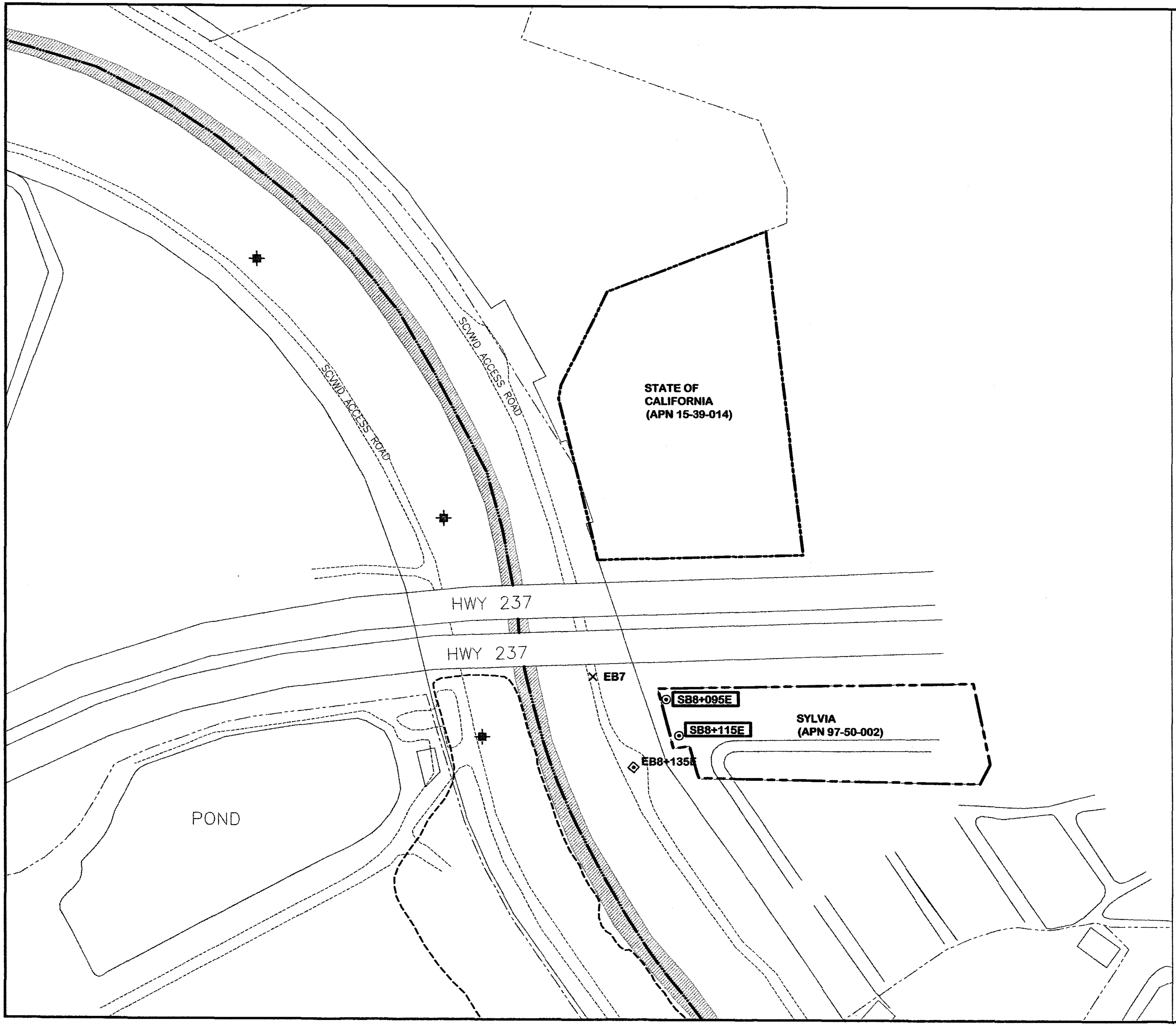

LEGEND

▬ ‒ ▬	SITE BOUNDARY
▬ · ▬	GUADALUPE RIVER CHANNEL
───	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
⌖	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
SCVWD	SANTA CLARA VALLEY WATER DISTRICT
◈ **EB7+300W**	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
× **W1**	GEOTECHNICAL SOIL BORING (installed by URS Woodward–Clyde, May 1998)

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 2," dated 1–10–97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SYLVIA
(APN 97-50-002)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO.	ACAD FILE:
12–305800–001	1230580\4_5–03.dwg

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LGS	CHA	CC/KB

DATE: 12–8–00
SCALE: SEE BAR SCALE
DRAWING NO.
4.5.3

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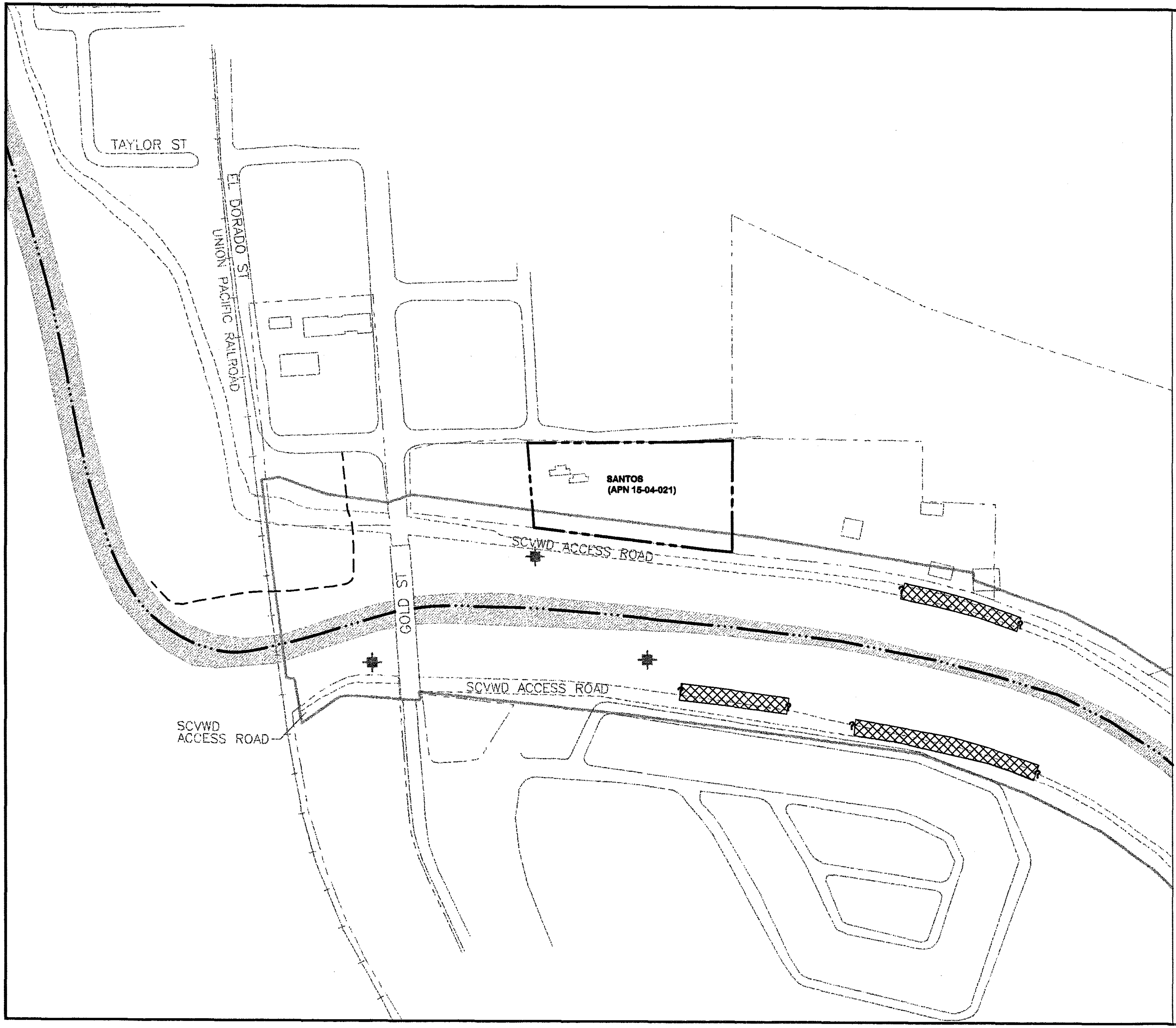

LEGEND

— — —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▒▒▒	PROJECT LIMITS
- - - -	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 1," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SANTOS

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_6-01.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.6.1**

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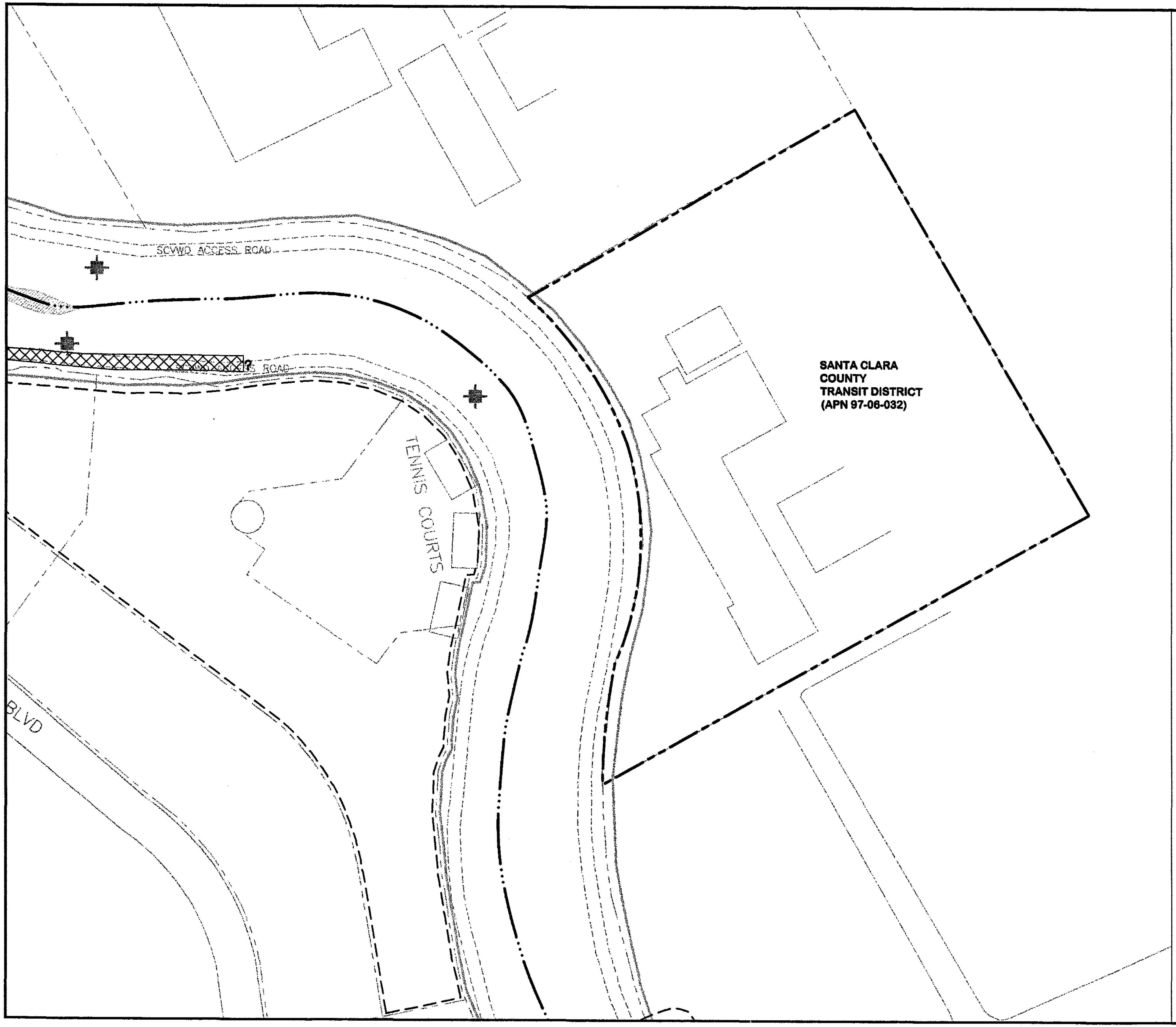

LEGEND

— - — - —	SITE BOUNDARY
—— · · · ——	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 6," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
SANTA CLARA COUNTY
TRANSIT DISTRICT

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_6-02.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.6.2**

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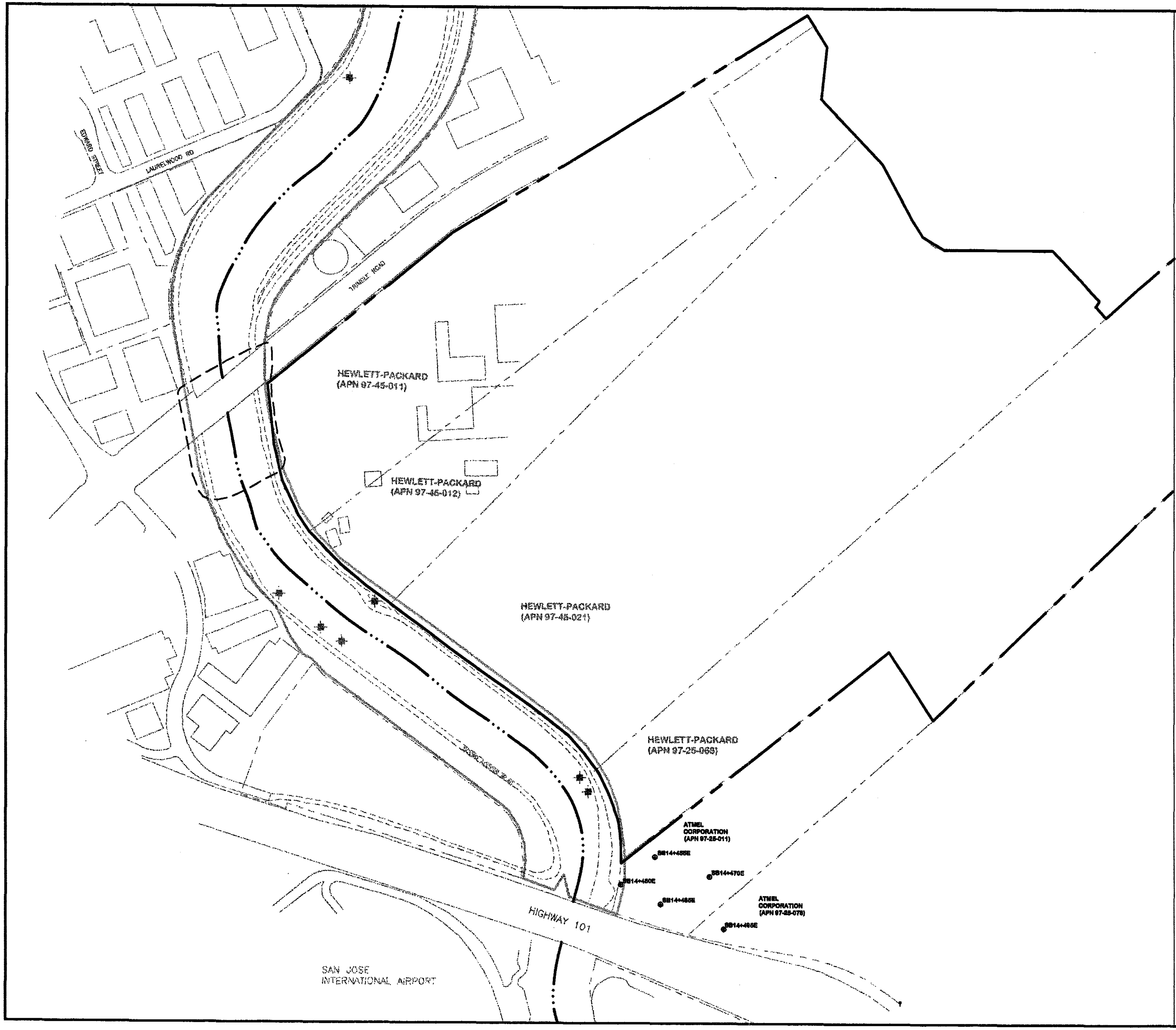
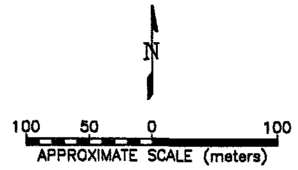

EDWARD STREET
LAURELWOOD RD
TRIMBLE ROAD
HEWLETT-PACKARD (APN 97-45-011)
HEWLETT-PACKARD (APN 97-45-012)
HEWLETT-PACKARD (APN 97-45-021)
HEWLETT-PACKARD (APN 97-25-068)
ATMEL CORPORATION (APN 97-25-011)
ATMEL CORPORATION (APN 97-25-078)
SB14+455E
SB14+460E
SB14+470E
SB14+485E
SB14+495E
HIGHWAY 101
SAN JOSE INTERNATIONAL AIRPORT

LEGEND

▬ ▬ ▬	SITE BOUNDARY
▬ · · · ▬	GUADALUPE RIVER CHANNEL
═══	PROJECT LIMITS
— — — —	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
⊙ **SB7+105E**	SOIL BORING (Direct Push in areas with no Archeological concerns)
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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△			
△			
△			

SITE INVESTIGATION
HEWLETT-PACKARD
(APN 97-45-011,-012, -021 & 97-25-068)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_6-03.dwg
DRAWN BY: LCS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.6.3**

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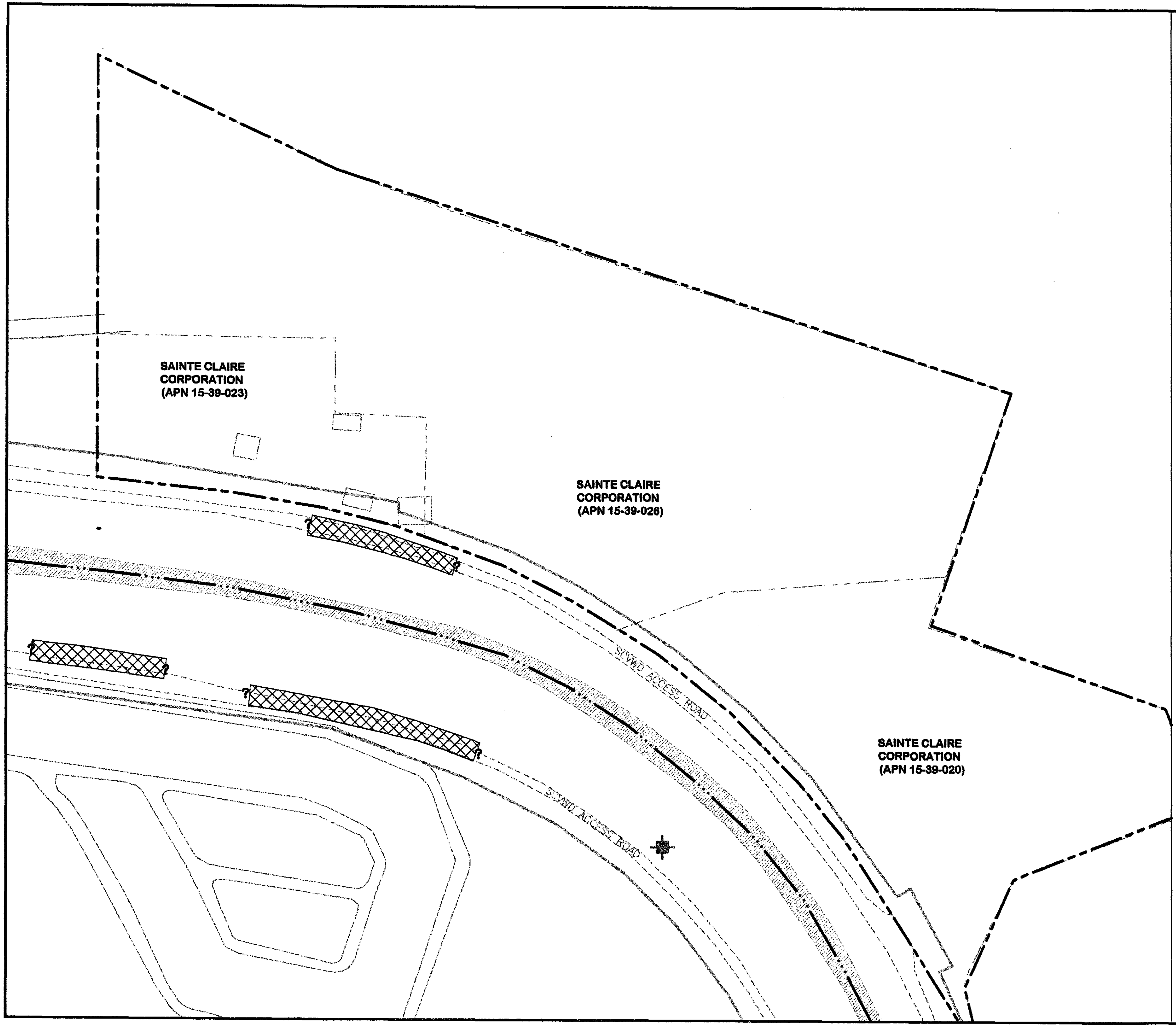

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 2," dated 1-10-97.

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_6-04.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

SITE INVESTIGATION
SAINTE CLAIRE CORPORATION
(APN 15-39-020,-021, & -023)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

NO.	REVISION	BY	DATE
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△			

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.6.4**

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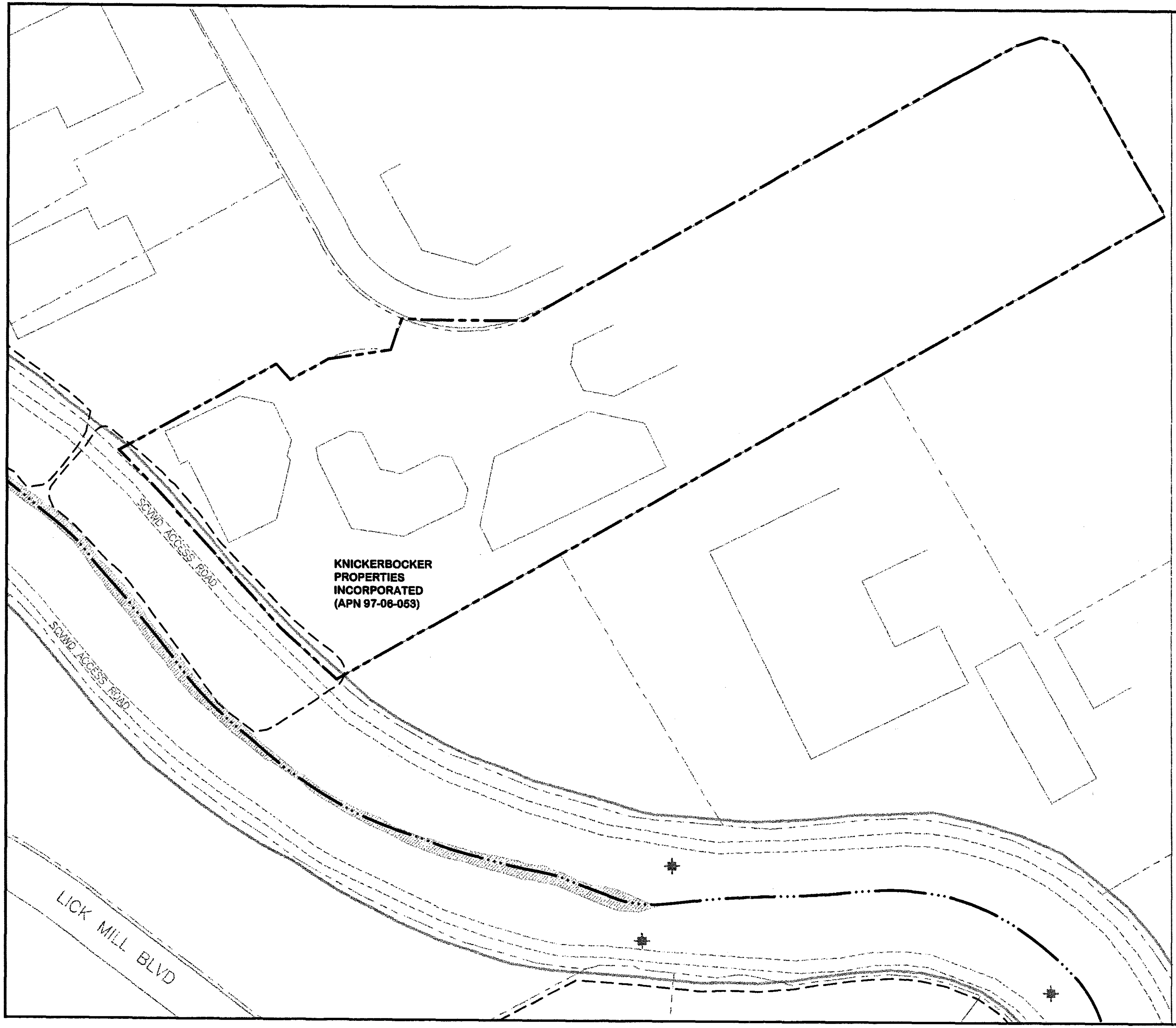

LEGEND

- ━ ‒ ‒ ━ SITE BOUNDARY
- ━ ··· ━ GUADALUPE RIVER CHANNEL
- ▨ PROJECT LIMITS
- ‒ ‒ ‒ ‒ ARCHEOLOGICAL SITE BOUNDARY
- ✵ DRAIN OUTFALL
- SCVWD SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 5," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
KNICKERBOCKER PROPERTIES
INCORPORATED

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:

SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER

1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:		
12-305801-900	4_6-05.dwg		
DRAWN BY: LGS	CHECKED BY: CHA	DESIGNED BY: CC/KB	

DATE: 12-8-00

SCALE: SEE BAR SCALE

DRAWING NO.
4.6.5

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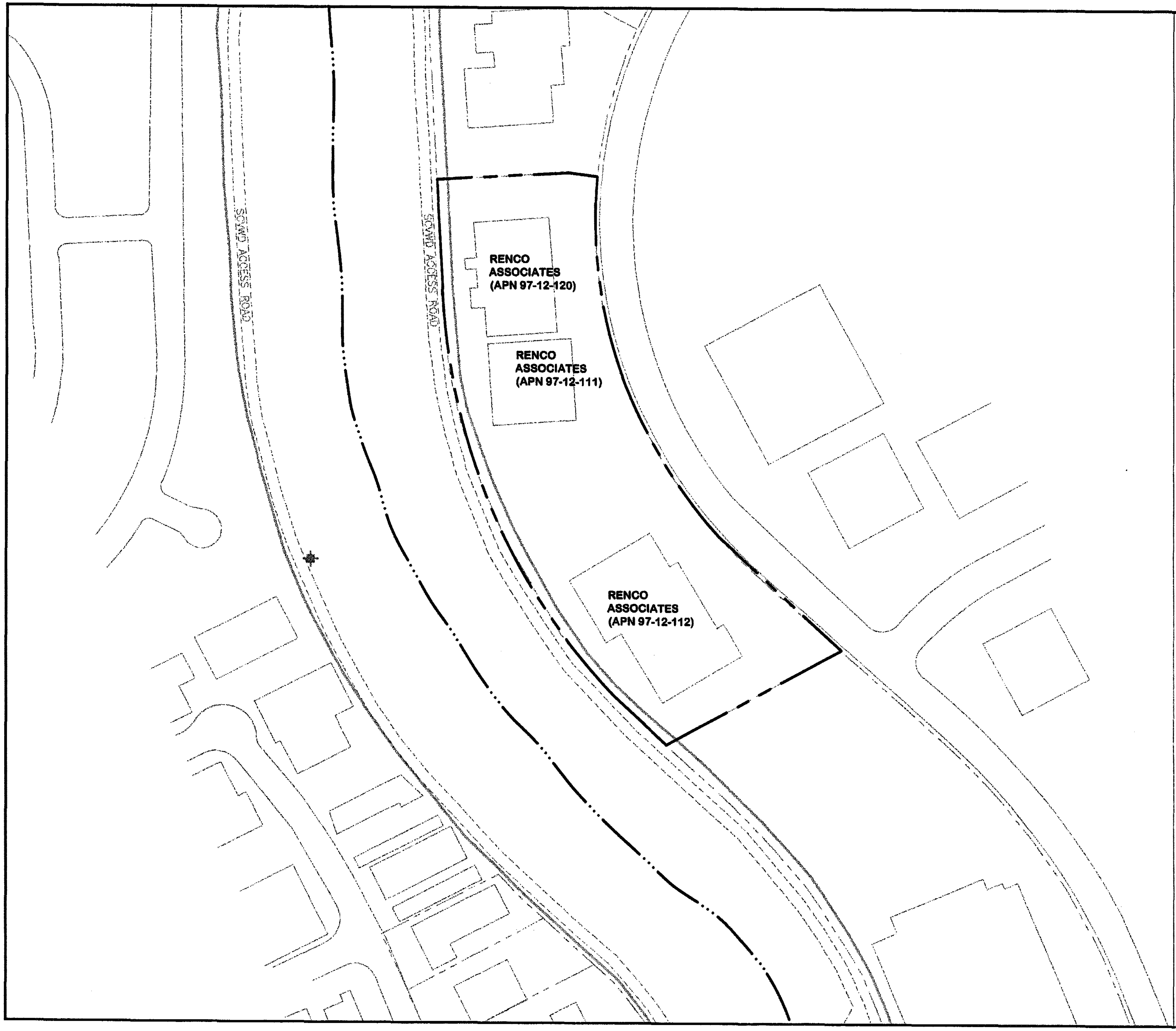
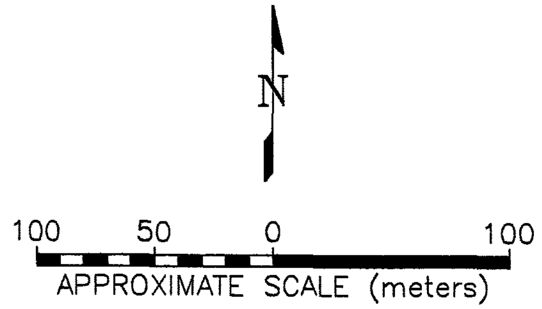

SCVWD ACCESS ROAD
SCVWD ACCESS ROAD
RENCO ASSOCIATES (APN 97-12-120)
RENCO ASSOCIATES (APN 97-12-111)
RENCO ASSOCIATES (APN 97-12-112)

LEGEND

— — —	SITE BOUNDARY
—···—	GUADALUPE RIVER CHANNEL
▬	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✤	DRAIN OUTFALL
SCVWD	SANTA CLARA VALLEY WATER DISTRICT

NOTE: Locations are approximate.



APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Alviso Marina to Highway 880, Level II Hazmat, Sheet 7," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
RENCO ASSOCIATES
(APN 97-12-120, -111, & -112)

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS 0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:	
12-305801-900	4_6-06.dwg	
DRAWN BY: LGS	CHECKED BY: CHA	DESIGNED BY: CC/KB

DATE:
12-8-00

SCALE:
SEE BAR SCALE

DRAWING NO.
4.6.6

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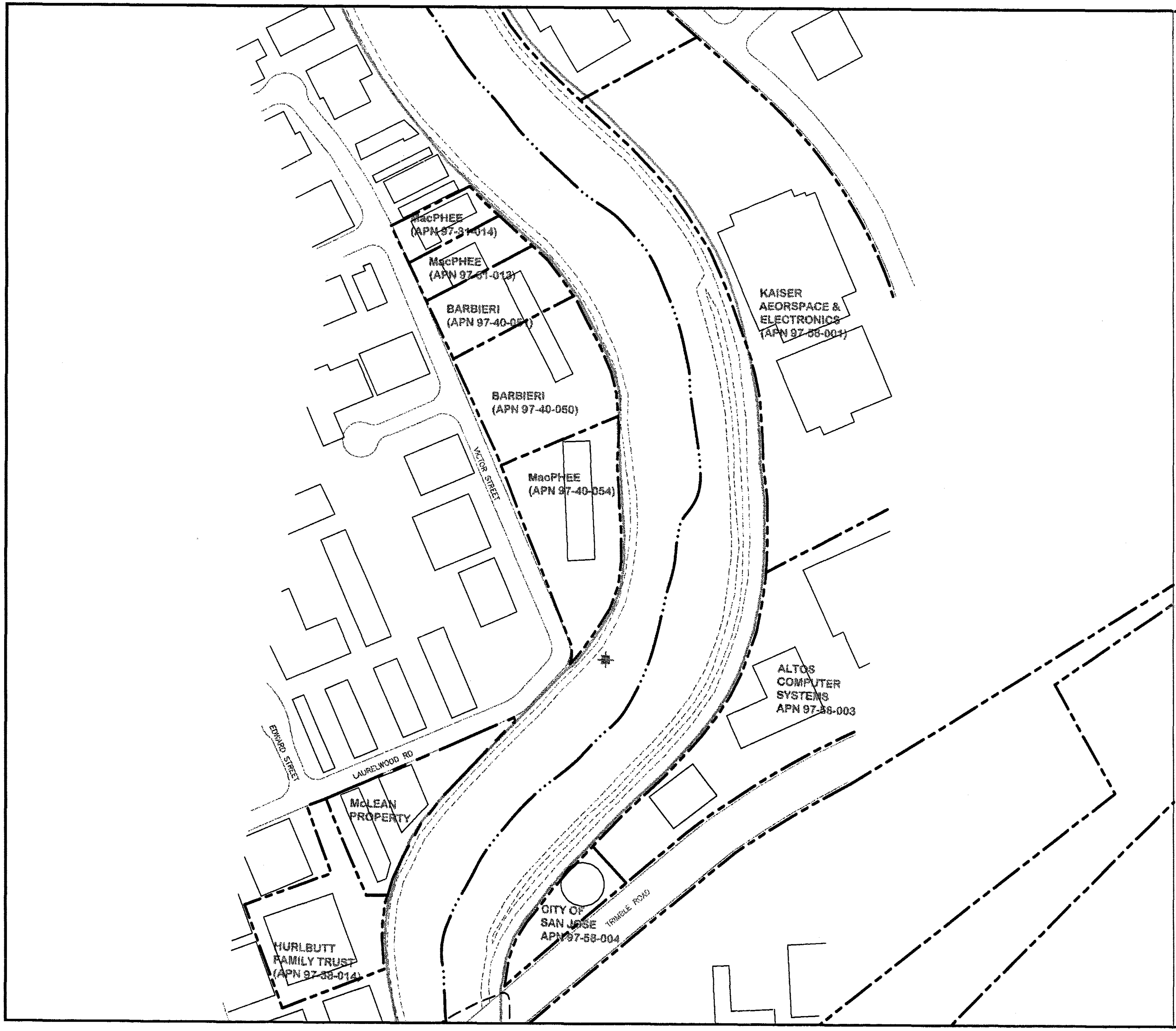

LEGEND

— - — SITE BOUNDARY

—··· — GUADALUPE RIVER CHANNEL

PROJECT LIMITS

– – – – ARCHEOLOGICAL SITE BOUNDARY

⌖ DRAIN OUTFALL

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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SITE INVESTIGATION
GOGUEN et al. PROPERTY

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_6-07.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE:
12-8-00

SCALE:
SEE BAR SCALE

DRAWING NO.
4.6.7

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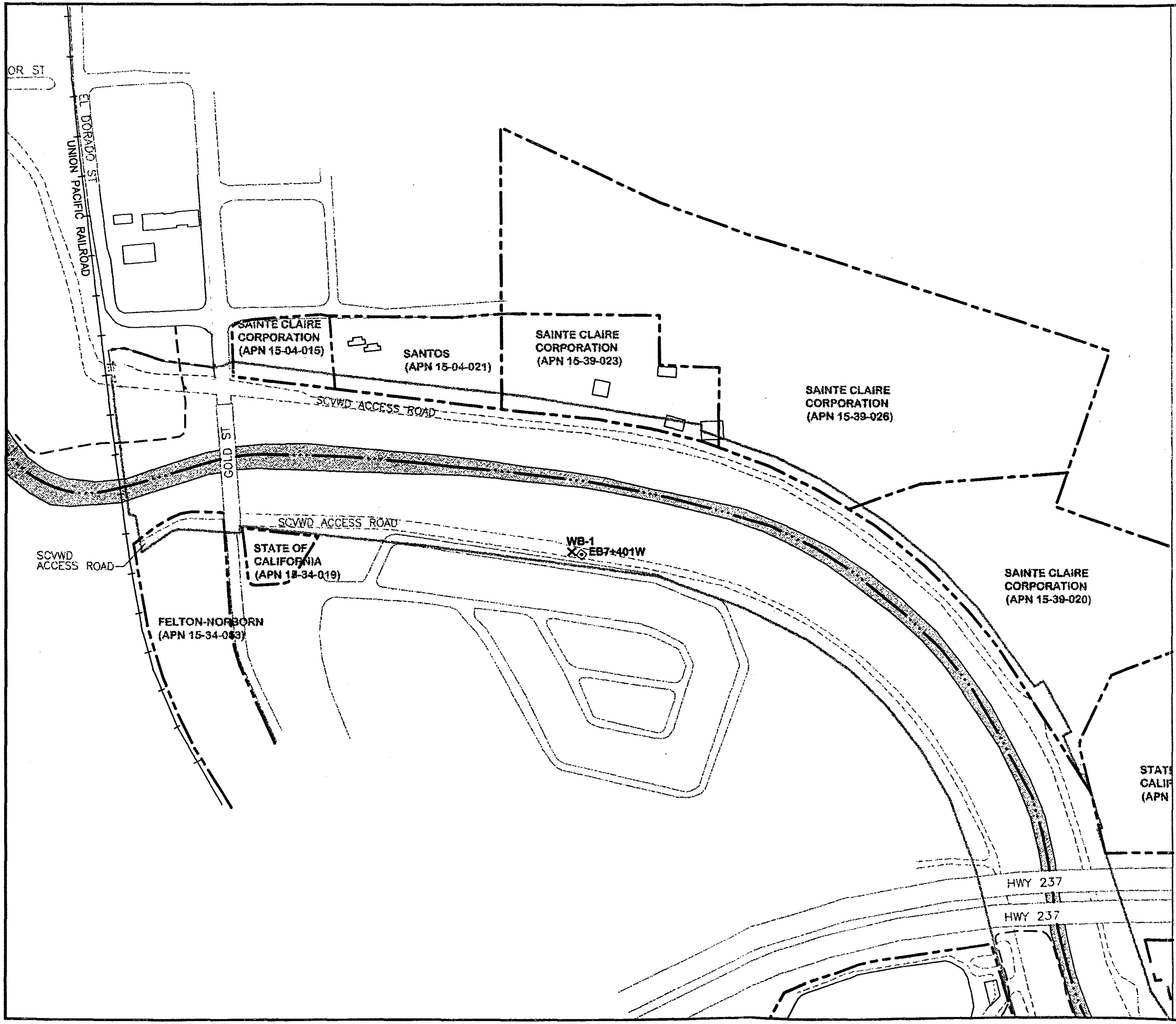

OR ST
EL DORADO ST
UNION PACIFIC RAILROAD
SAINTE CLAIRE CORPORATION (APN 15-04-015)
SANTOS (APN 15-04-021)
SAINTE CLAIRE CORPORATION (APN 15-39-023)
SAINTE CLAIRE CORPORATION (APN 15-39-026)
SCVWD ACCESS ROAD
GOLD ST
SCVWD ACCESS ROAD
SCVWD ACCESS ROAD
STATE OF CALIFORNIA (APN 15-34-019)
WB-1
EB7±401W
FELTON-NORBORN (APN 15-34-053)
SAINTE CLAIRE CORPORATION (APN 15-39-020)
STAT CALIF (APN
HWY 237
HWY 237

LEGEND

- SITE BOUNDARY
- GUADALUPE RIVER CHANNEL
- PROJECT LIMITS
- ARCHEOLOGICAL SITE BOUNDARY
- DRAIN OUTFALL

◈ EB7+397W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
× W1	GEOTECHNICAL SOIL BORING (installed by URS Woodward–Clyde, May 1998)

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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△			
△			
△			
△			

OPTIONAL WORK
GEOTECHNICAL BORING, WB-1

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4.7-01a.dwg
DRAWN BY: LCS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO.
4.7.1a

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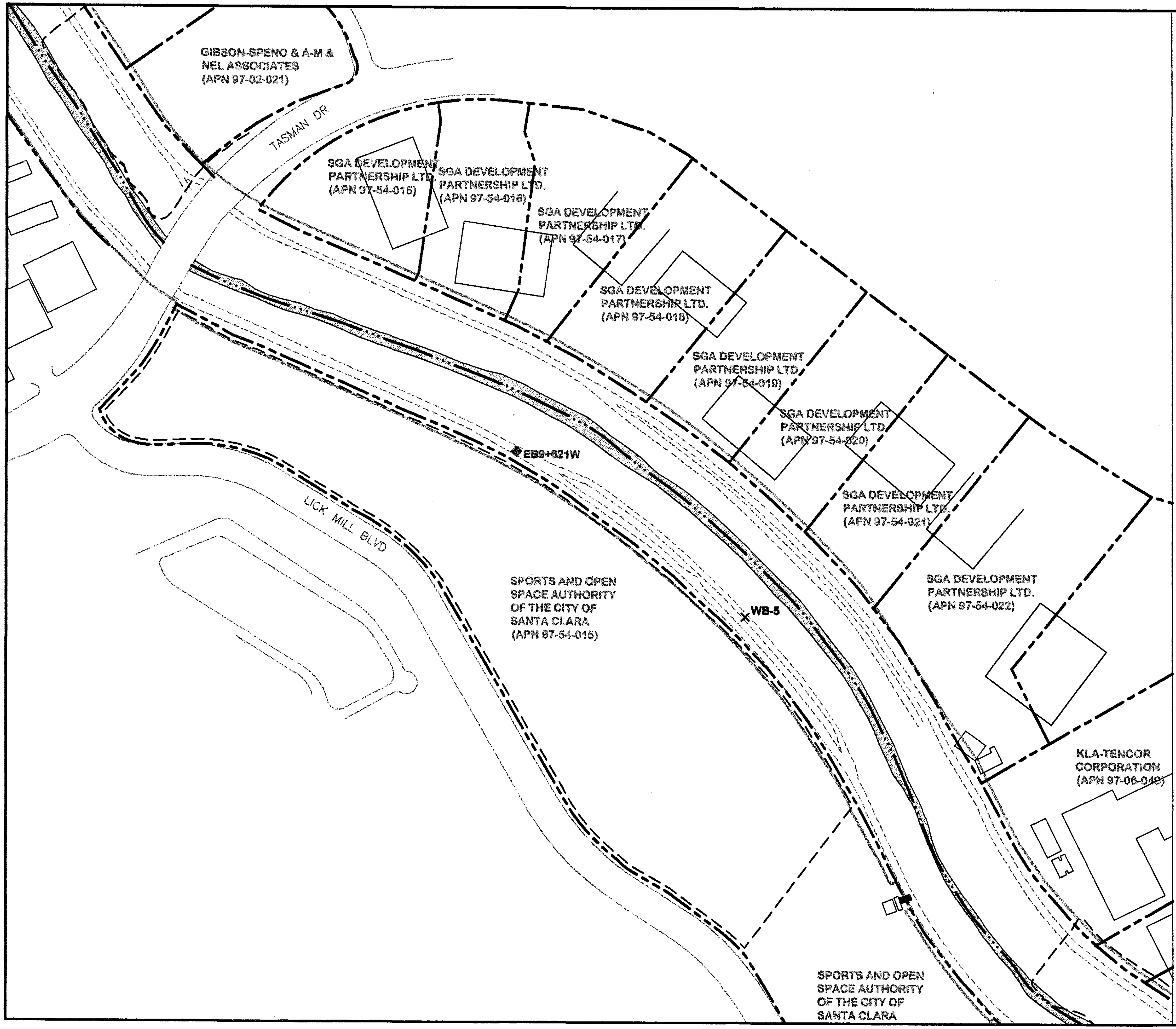
GIBSON-SPENO & A-M & NEL ASSOCIATES (APN 97-02-021)
TASMAN DR
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-015)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-016)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-017)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-018)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-019)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-020)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-021)
SGA DEVELOPMENT PARTNERSHIP LTD. (APN 97-54-022)
EB9+621W
LICK MILL BLVD
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF SANTA CLARA (APN 97-54-015)
WB-5
KLA-TENCOR CORPORATION (APN 97-06-049)
SPORTS AND OPEN SPACE AUTHORITY OF THE CITY OF SANTA CLARA

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✦	DRAIN OUTFALL
◆ EB7+397W	EMBANKMENT SOIL BORING (Hollow Stem Auger in areas noted as Archeological sites)
× WB-5	GEOTECHNICAL SOIL BORING (installed by URS Woodward-Clyde, May 1998)

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
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OPTIONAL WORK
GEOTECHNICAL BORING, WB-5

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO.	ACAD FILE:
12-305801-900	4_7-01b.dwg

DRAWN BY:	CHECKED BY:	DESIGNED BY:
LGS	CHA	CC/KB

DATE:
12-8-00
SCALE:
SEE BAR SCALE
DRAWING NO.
4.7.1b

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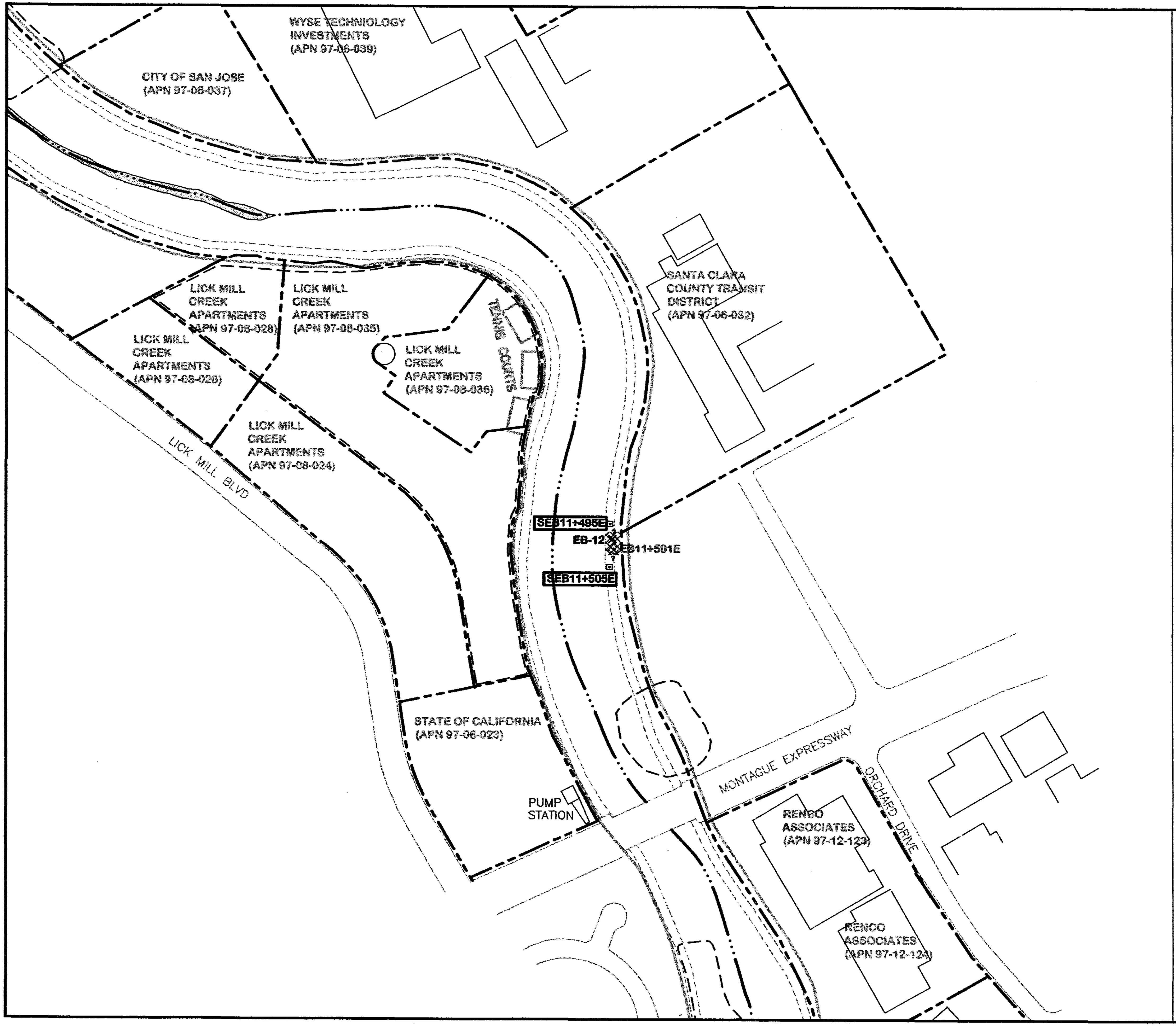
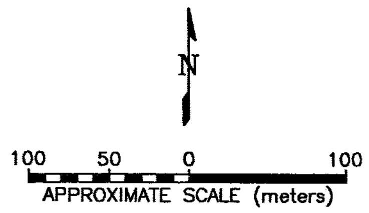

WYSE TECHNIOLOGY INVESTMENTS (APN 97-06-039)
CITY OF SAN JOSE (APN 97-06-037)
SANTA CLARA COUNTY TRANSIT DISTRICT (APN 97-06-032)
LICK MILL CREEK APARTMENTS (APN 97-08-028)
LICK MILL CREEK APARTMENTS (APN 97-08-035)
LICK MILL CREEK APARTMENTS (APN 97-08-026)
LICK MILL CREEK APARTMENTS (APN 97-08-036)
TENNIS COURTS
LICK MILL CREEK APARTMENTS (APN 97-08-024)
LICK MILL BLVD
SEB11+495E
EB-12
SEB11+501E
SEB11+505E
STATE OF CALIFORNIA (APN 97-06-023)
PUMP STATION
MONTAGUE EXPRESSWAY
ORCHARD DRIVE
RENCO ASSOCIATES (APN 97-12-123)
RENCO ASSOCIATES (APN 97-12-124)

LEGEND

— - - —	SITE BOUNDARY
—··—	GUADALUPE RIVER CHANNEL
═══	PROJECT LIMITS
— — —	ARCHEOLOGICAL SITE BOUNDARY
✱	DRAIN OUTFALL
◈ EB7+397W	EMBANKMENT SOIL BORING (Direct Push in areas with no Archeological concerns)
⊡ SEB7+140E	COMBINATION BORING TO INCLUDE SAMPLING FOR EMBANKMENT SOIL AND INDIVIDUAL SITE INVESTIGATION (installed by Direct Push)
× W1	GEOTECHNICAL SOIL BORING (installed by URS Woodward–Clyde, May 1998)
SEB7+010E	SAMPLE COLLECTED DURING THE PHASE II SAMPLING EVENT
▨	AREA WITH PESTICIDES IN EXCESS OF TTLCs

NOTE: Locations are approximate.



REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1–10–97.

NO.	REVISION	BY	DATE

OPTIONAL WORK
GEOTECHNICAL BORING, EB-12

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO. 12–305801–900
ACAD FILE: 4_7–01c.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12–8–00
SCALE: SEE BAR SCALE
DRAWING NO. 4.7.1c

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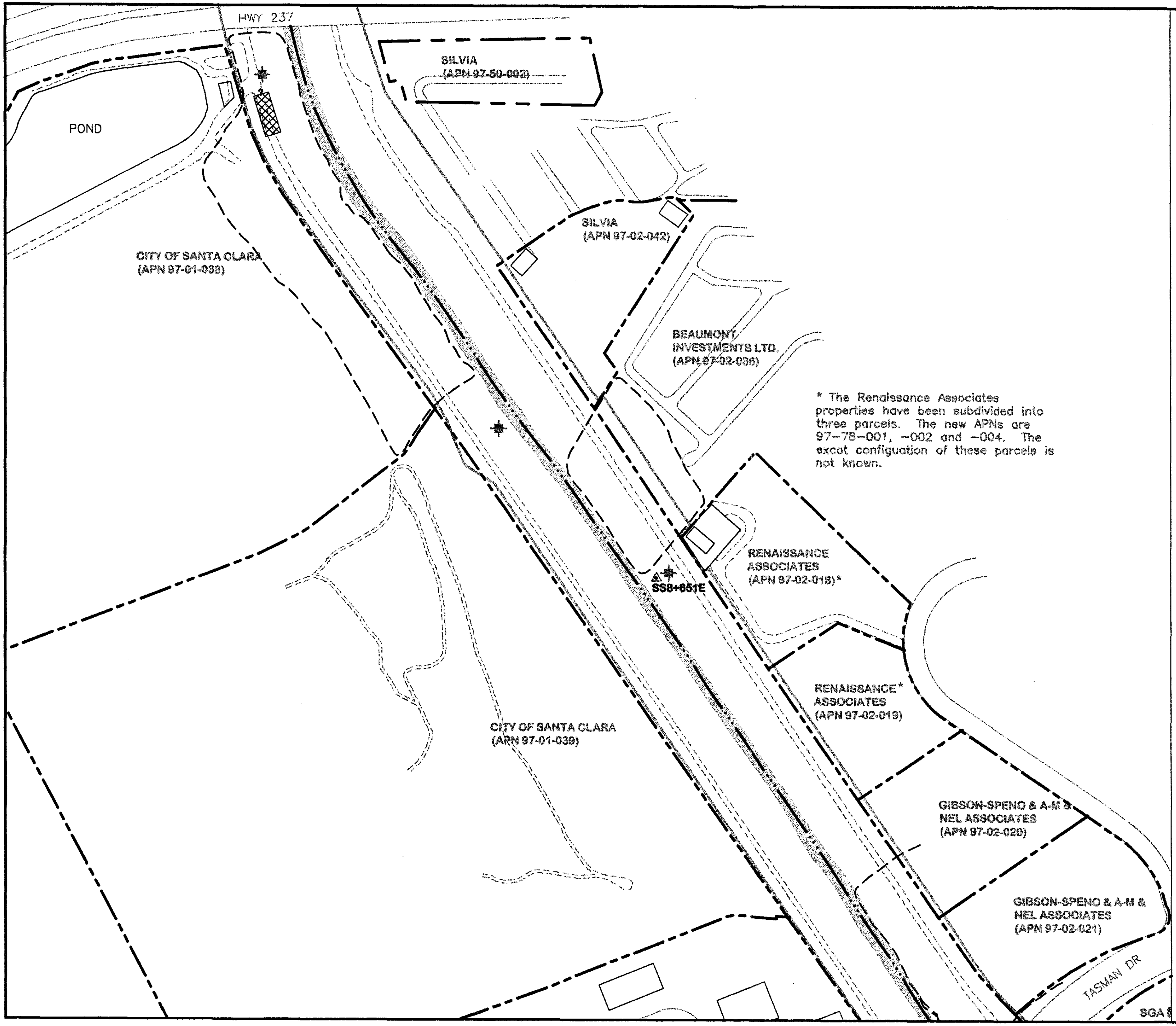

* The Renaissance Associates properties have been subdivided into three parcels. The new APNs are 97–78–001, –002 and –004. The excat configuation of these parcels is not known.

LEGEND

- — - - — SITE BOUNDARY
- —··· — GUADALUPE RIVER CHANNEL
- PROJECT LIMITS
- — — — — ARCHEOLOGICAL SITE BOUNDARY
- DRAIN OUTFALL
- ▲ SS7+259E RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)

NOTE: Locations are approximate.

N

100 50 0 100

APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1–10–97.

NO.	REVISION	BY	DATE
△			
△			
△			
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△			

OPTIONAL WORK
STORM DRAIN INVESTIGATION

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436–1155 FAX. (408) 436–1771

PROJ. NO. 12–305801–800
ACAD FILE: 4_7–02a.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12–8–00
SCALE: SEE BAR SCALE
DRAWING NO. 4.7.2a

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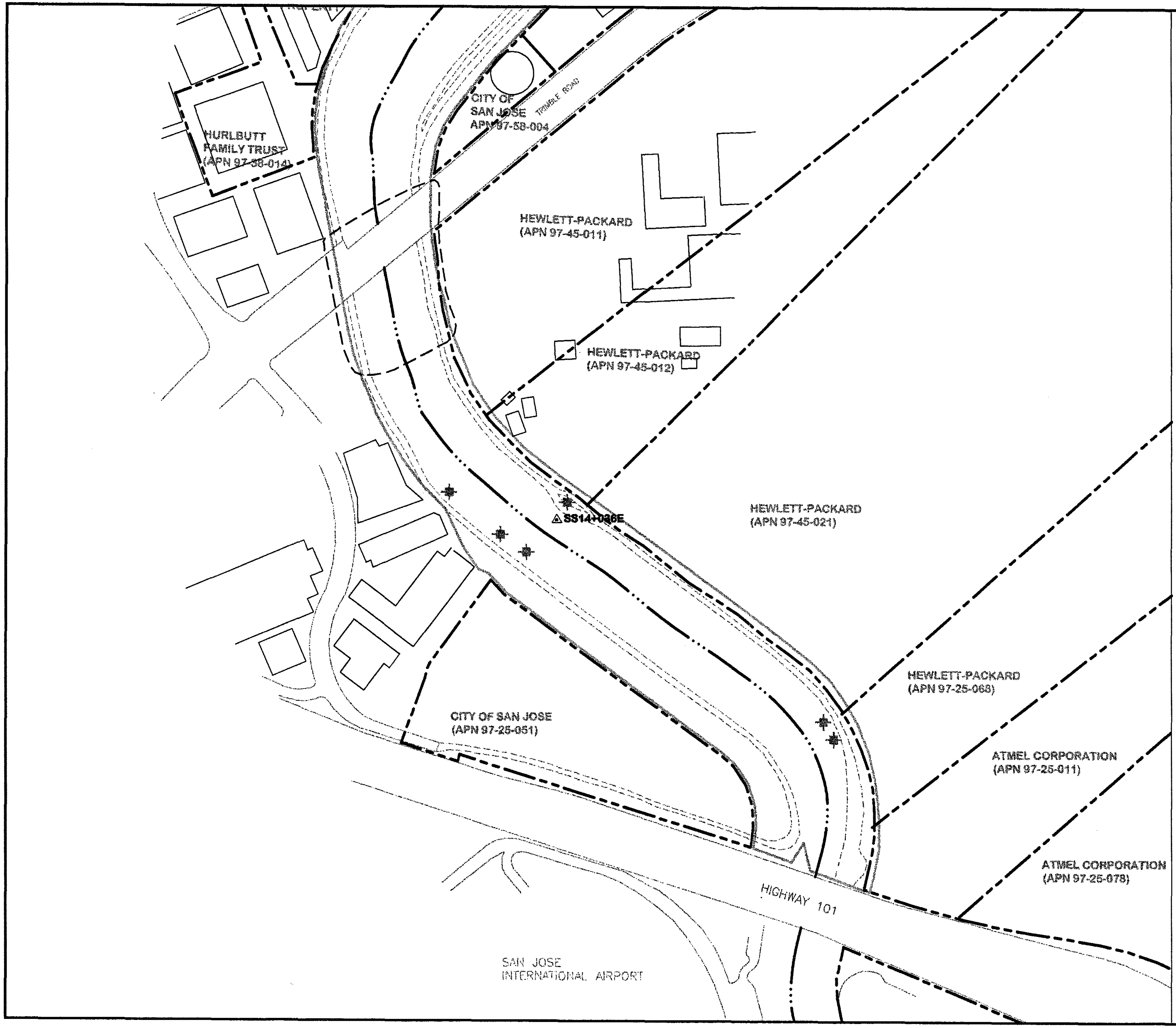

LEGEND

- SITE BOUNDARY
- GUADALUPE RIVER CHANNEL
- PROJECT LIMITS
- ARCHEOLOGICAL SITE BOUNDARY
- DRAIN OUTFALL
- △ SS7+259E RIVER SEDIMENT SAMPLE (Direct Push or Hand Auger in areas with no Archeological concerns)

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District, "Guadalupe River, Level II Hazmat, Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
△			
△			
△			
△			
△			

OPTIONAL WORK
STORM DRAIN INVESTIGATION

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-800
ACAD FILE: 4_7-02b.dwg
DRAWN BY: LCS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: SEE BAR SCALE
DRAWING NO. **4.7.2b**

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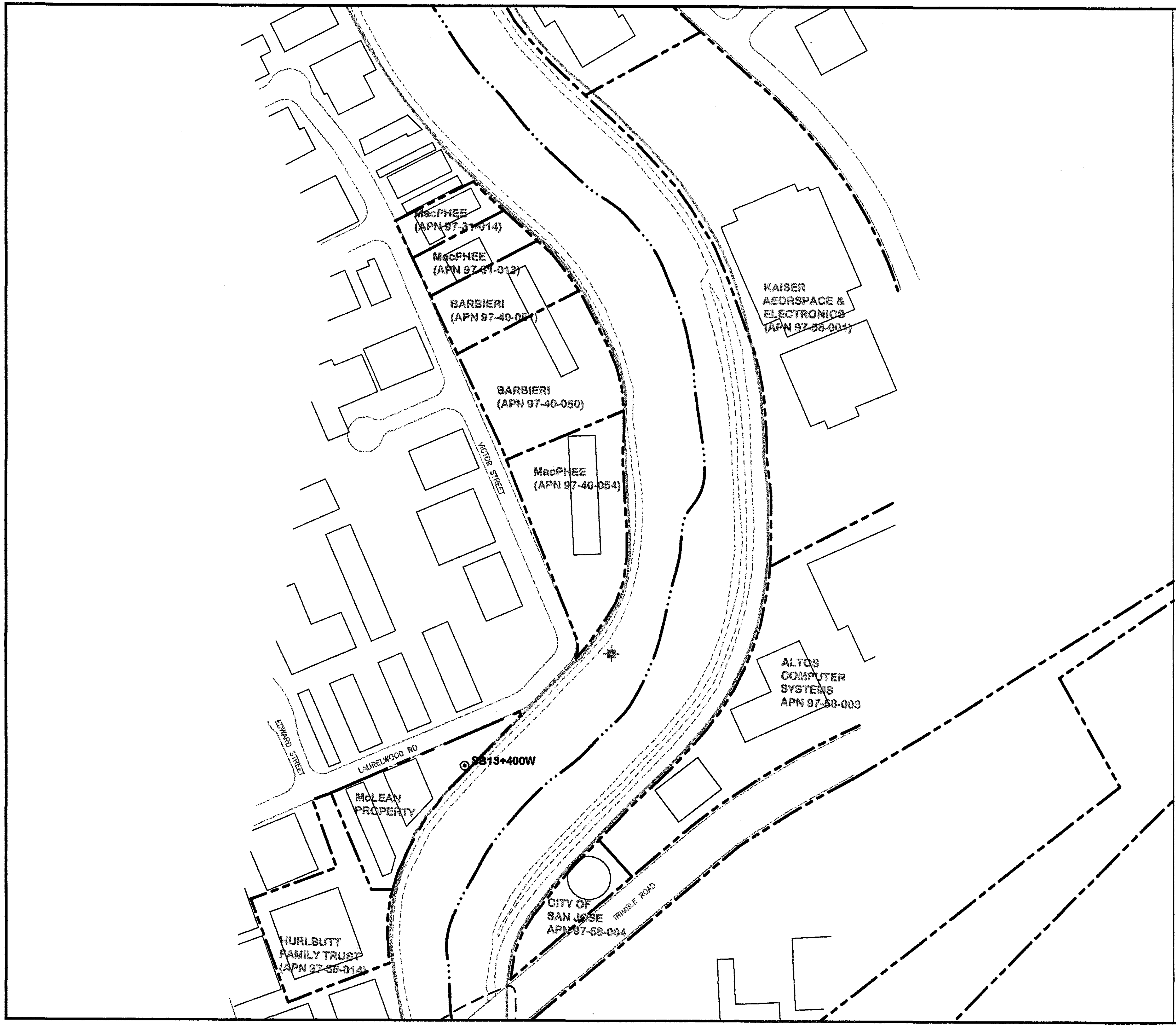

LEGEND

— - - —	SITE BOUNDARY
—··· —	GUADALUPE RIVER CHANNEL
▨	PROJECT LIMITS
- - - - -	ARCHEOLOGICAL SITE BOUNDARY
✳	DRAIN OUTFALL
⊙ **SB13+400W**	SOIL BORING (Direct Push in areas with no Archeological concerns)

NOTE: Locations are approximate.

N

100 50 0 100
APPROXIMATE SCALE (meters)

REFERENCE:
Santa Clara Valley Water District,
"Guadalupe River, Level II Hazmat,
Sheets 1 through 9," dated 1-10-97.

NO.	REVISION	BY	DATE
△			
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△			

OPTIONAL WORK
McLEAN PROPERTY

LOWER GUADALUPE RIVER
LEVEL II HAZARDOUS MATERIAL INVESTIGATION
SANTA CLARA COUNTY, CALIFORNIA

CLIENT:
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY
SANTA CLARA COUNTY, CALIFORNIA

ORIGINAL SCALE IN CENTIMETERS FOR REDUCED PLANS
0 1 2 3 4 5

KLEINFELDER
1362 RIDDER PARK DRIVE
SAN JOSE, CA 95131
PH. (408) 436-1155 FAX. (408) 436-1771

PROJ. NO. 12-305801-900
ACAD FILE: 4_7-03.dwg
DRAWN BY: LGS
CHECKED BY: CHA
DESIGNED BY: CC/KB

DATE: 12-8-00
SCALE: 1:120
DRAWING NO.
4.7.3

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